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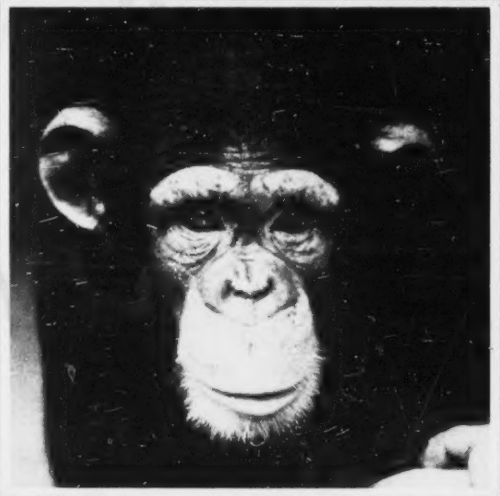
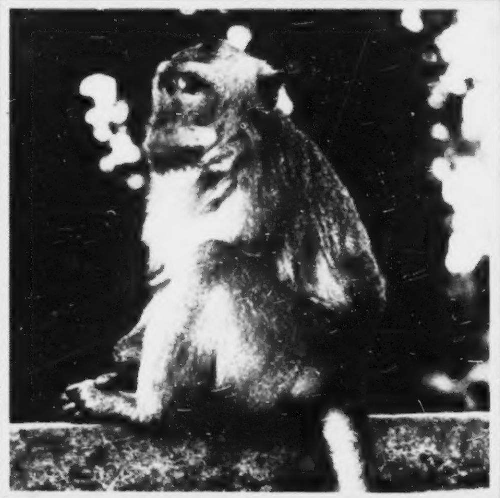
THE INTERNATIONAL PRIMATE TRADE

Volume 1





Edited by David Mack and Russell A. Mittermeier

TRAFFIC(U.S.A.)

COVER:

Four important species in the international primate trade.

Upper left: The rhesus monkey (*Macaca mulatta*), the primate species most used in research over the past 20 years (photo by R. A. Mittermeier).

Upper right: The chimpanzee *(Pan troglodytes)*, considered a very important species in biomedical research because of its close proximity to man, but now threatened over most of its range (photo by R. A. Mittermeier).

Lower left: The squirrel monkey *(Saimiri sciureus)*, the New World monkey most frequently imported into the U.S. over the past 20 years (photo by R. A. Mittermeier).

Lower right: The long-tailed or crab-eating macaque (*Macaca fascicularis*), the most frequently used species in research since India banned the trade in rhesus monkeys in 1978 (photo by R. A. Mittermeier).

THE INTERNATIONAL PRIMATE TRADE

Volume 1

Legislation, Trade and Captive Breeding

A joint publication of TRAFFIC (U.S.A.), the World Wildlife Fund-U.S.
Primate Program and the IUCN/SSC Primate Specialist Group

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1984

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The cotton-top tamarin (*Saguinus oedipus*), an endangered species from northern Colombia that was once exported in large numbers for biomedical research (photo by Neal Johnston, courtesy Los Angeles Zoo).

Introduction

David Mack
and
Russell A. Mittermeier

Nonhuman primates have always been of great interest to our own species because of our close phylogenetic relationships. However, the importance of primates to human society has grown considerably in the past three decades, in part because of the realization that field and laboratory studies of behavior and ecology can teach us more about ourselves and our origins and also because of the important role that these animals have played in biomedical research.

In addition, primates have traditionally been a source of food for man in several parts of the world, notably in Amazonia, West Africa and Central Africa. Such hunting has become even more serious with the increase in human population, the arrival of more sophisticated weapons, the disappearance of larger game species, and the decrease in available habitat.

In spite of their growing importance, wild populations of nonhuman primates have suffered their most serious declines during the last three decades. This is especially true of the tropical forest species, which make up roughly 90% of the Order, but has affected even the widespread and adaptable savanna-dwellers. The burgeoning human population is penetrating into the remotest corners of the tropics, destroying or drastically modifying previously undisturbed areas of primate habitat, and the large-scale development programs undertaken by many tropical countries have accelerated the process. Once abundant primate species are becoming depleted, and many that were rare or endangered in the past are being pushed to the brink of extinction. According to the *IUCN Mammal Red Data Book* (Table 1), one in every three primate species is already considered endangered, vulnerable or rare, and one in seven is so endangered that it could be extinct by the turn of the century or even sooner if something isn't done quickly.

Although rarely the major factor in the decline of a species, a demand for live, wild-caught primates has added to the other pressures and has often been a more conspicuous threat than either habitat destruction or hunting. The global trade in live primates began in earnest in the 1950's with large imports of rhesus monkeys for the production of polio vaccine, and a second spurt in the 1960's when New World monkeys entered both the research and pet trades in substantial numbers. Tens and hundreds of thousands of individuals of the most popular species were removed from the wild, without the barest minimum of demographic data or other ecological information, and it is likely that several animals died in capture and transport for each one that eventually reached its final destination.

Due to the rapid growth and large volume of trade, governments of source countries realized that nonhuman primates had become an important natural resource, and the absence of data on the trade's effects on these animals soon became a source of concern to exporting countries and conservationists alike. Another problem was that much of the profit in the primate trade seemed to be accruing to foreign-based dealers, with minimal benefit to the countries from which the animals originated. Eventually, the combination of these and other factors led to the declaration of export bans in many of the principal source countries, which in turn led to a decline in the total number of primates removed from the wild and increased emphasis on captive breeding and recycling in user countries.

The potential or actual threat that the trade posed to endangered and vulnerable species also led the International Union for Conservation of Nature and Natural Resources (IUCN) to formulate a *Policy Statement on Use of Primates for Biomedical Purposes* (Table 2). This statement was first drafted by the Primate Specialist Group of IUCN's Species Survival Commission (SSC), and was subsequently adopted by the World Health Organization (WHO) and the Ecosystem Conservation Group (ECG) of the United Nations, which includes the Food and Agriculture Organization (FAO), United Nations Environment Programme (UNEP) and United Nations Economic, Scientific and Cultural Organization (UNESCO) in addition to IUCN. It now serves as one of the principal guidelines for rational use of wild primate populations.

Although the global primate trade has always been a source of much discussion and controversy and the subject of dozens of scientific and popular articles, it has never been rigorously analyzed in a single volume. This book attempts to provide such an analysis, and includes chapters on the international and U.S. trade, use and captive breeding of primates in the world and in the U.S. in particular, and trade laws dealing with primates. The legislation chapter also includes a very useful list of the primate species found in every country that has native or introduced populations of these animals. A second volume, which will appear in 1986, will cover the distribution and conservation status of the most important research species from Africa, Asia and the Neotropics. Together, these two volumes should provide a reference work that will hopefully be used by everyone concerned with the future of primates — be they conservationists, protectionists, laboratory researchers, government authorities or law enforcement officials — and should help to establish guidelines for future use of primates by the research community. In other words, we hope that these volumes will help to provide the basis for a carefully monitored, legal, rational trade that will not adversely affect the survival of any primate species and will help to further the goals of international primate conservation.

The International Primate Trade

TABLE 1. LIST OF PRIMATES IN THE IUCN MAMMAL RED DATA BOOK.

Lemuridae			
72	E	*Lemur macaco macaco*	Black lemur
72	E	*Lemur macaco rufus*	Red-fronted lemur
72	E	*Lemur macaco flavifrons*	Sclater's lemur
72	E	*Lemur macaco sanfordi*	Sanford's lemur
72	V	*Lemur mongoz*	Mongoose lemur
72	E	*Lepilemur mustelinus ruficaudatus*	Red-tailed sportive lemur
72	R	*Lepilemur mustelinus dorsalis*	Nossi-be sportive lemur
72	E	*Lepilemur mustelinus leucopus*	White-footed sportive lemur
72	V	*Hapalemur griseus*	Grey gentle lemur
72	R	*Hapalemur simus*	Broad-nosed gentle lemur
72	R	*Allocebus trichotis*	Hairy-eared dwarf lemur
72	V	*Cheirogaleus medius*	Fat-tailed dwarf lemur
72	V	*Microcebus coquereli*	Coquerel's mouse lemur
72	I	*Phaner furcifer*	Fork-marked mouse lemur
Indriidae			
78	E	*Indri indri*	Indris or indri
72	E	*Propithecus verreauxi*	Verreaux's sifaka
72	R	*Propithecus diadema perrieri*	Perrier's sifaka
72	V	*Avahi laniger occidentalis*	Western woolly avahi
Daubentoniidae			
72	E	*Daubentonia madagascariensis*	Aye-aye
Tarsiidae			
78	I	*Tarsius bancanus borneanus*	Bornean tarsier
78	E	*Tarsius syrichta*	Philippine tarsier
Callitrichidae			
82	E	*Callithrix flaviceps*	Buffy-headed marmoset
82	V	*Callithrix argentata leucippe*	White marmoset
82	E	*Callithrix aurita*	Buffy-tufted-ear marmoset
82	V	*Callithrix humeralifer*	Tassel-eared marmoset
82	E	*Saguinus oedipus oedipus*	Cotton-top tamarin
82	I	*Saguinus bicolor*	Bare-face tamarin
82	I	*Saguinus imperator*	Emperor tamarin
82	V	*Saguinus leucopus*	White-footed tamarin
82	E	*Leontopithecus rosalia*	Golden lion tamarin
82	E	*Leontopithecus chrysopygus*	Golden-rumped lion tamarin
82	E	*Leontopithecus chrysomelas*	Golden-headed lion tamarin
82	R	*Callimico goeldii*	Goeldi's monkey
Cebidae			
82	E	*Saimiri oerstedi*	Central American Squirrel monkey
82	V	*Callicebus personatus*	Masked titi
82	V	*Chiropotes albinasus*	White-nosed saki
82	E	*Chiropotes satanas satanas*	Southern bearded saki
82	V	*Cacajao calvus*	Uakari (red and white)
82	V	*Cacajao melanocephalus*	Black-headed uakari
82	I	*Alouatta fusca*	Brown howler monkey
82	I	*Alouatta villosa*	Guatemalan howler monkey
82	E	*Lagothrix flavicauda*	Yellow-tailed woolly monkey
82	V	*Lagothrix lagotricha*	Woolly monkey
82	E	*Brachyteles arachnoides*	Woolly spider monkey; muriqui
82	I	*Ateles belzebuth*	Long-haired spider monkey
82	I	*Ateles fusciceps*	Brown-headed spider monkey
82	V	*Ateles geoffroyi*	Geoffroy's spider monkey
82	V	*Ateles paniscus*	Black spider monkey
Ceropithecidae			
76	E	*Cercocebus galeritus galeritus*	Tana River mangabey
78	E	*Papio leucophaeus*	Drill
76	E	*Macaca silenus*	Long-tailed macaque
76	V	*Macaca sylvanus*	Barbary macaque
78	I	*Macaca pagensis*	Mentawai Islands macaque
76	E	*Colobus badius rufomitratus*	Tana River red colobus
78	R	*Colobus badius gordonorum*	Uhehe red colobus
78	R	*Colobus badius kirkii*	Zanzibar red colobus
78	E	*Colobus badius preussi*	Preuss's red colobus
76	R	*Colobus verus*	Olive colobus
78	V	*Colobus satanas*	Black colobus
78	V	*Presbytis johnii*	Nilgiri langur
78	V	*Presbytis geei*	Golden langur
78	I	*Presbytis potenziani*	Mentawai Islands langur
78	V	*Nasalis larvatus*	Proboscis monkey
78	E	*Simias concolor*	Pig-tailed langur
76	R	*Rhinopithecus roxellanae*	Snub-nosed langur
72	E	*Pygathrix nemaeus*	Douc langur
Hylobatidae			
78	V	*Hylobates klossii*	Kloss's gibbon
78	E	*Hylobates pileatus*	Pileated gibbon
78	I	*Hylobates concolor*	Black gibbon
78	E	*Hylobates moloch*	Javan gibbon
Pongidae			
83	E	*Pongo pygmaeus*	Orang-utan
83	V	*Pan troglodytes*	Chimpanzee
83	V	*Pan paniscus*	Pygmy chimpanzee
83	V	*Gorilla gorilla*	Gorilla
83	E	*Gorilla gorilla berengei*	Mountain gorilla

The number (e.g., 78) preceding each taxon is the date of the last revision of that data sheet. The letter preceding each taxon is the category. E = endangered; V = vulnerable; R = rare; I = indeterminate.

Comments:

1. *Macaca arctoides* is a Red Data Book candidate.
2. Revised sheets for the Pongidae, Lemuridae, Indriidae, and Daubentoniidae are now available in draft form, and a number of modifications in the status of the species listed are anticipated.
3. *Tarsius spectrum* from Sulawesi, which was listed in the Red Data Book in 1978, has been delisted owing to recent evidence indicating that it is a great deal more common than previously believed.

ENDANGERED (E). Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included are taxa whose numbers have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction. Also included are taxa that are possibly already extinct, but that have definitely been seen in the wild in the past 50 years.

VULNERABLE (V). Taxa believed likely to move into the Endangered category in the near future if the causal factors continue operating. Included are taxa of which most of all the populations are decreasing because of overexploitation, extensive destruction of habitat, or other environmental disturbance; taxa with populations that have been seriously depleted and whose ultimate security has not yet been assured; and taxa with populations that are still abundant but are under threat from severe adverse factors throughout their range.

RARE (R). Taxa with small world populations that are not at present "endangered" or "vulnerable" but that are at risk. These taxa are usually localized within restricted geographical areas or habitats or are thinly scattered over a more extensive range.

INDETERMINATE (I). Taxa known to be "endangered," "vulnerable," or "rare" but for which there is not enough information to say which of the three categories is appropriate.

TABLE 2. POLICY STATEMENT ON USE OF PRIMATES FOR BIOMEDICAL PURPOSES

The ECG and WHO recognize that nonhuman primates play an important role in biomedical research and testing, and that their use as experimental animals has made a significant contribution to advances in human health and disease control.

The ECG and WHO are committed to maintaining the current diversity of the Order Primates and to ensuring the survival of representative, self-sustaining populations of all species in their natural habitats.

A total of 76 primate taxa are currently considered *endangered, vulnerable* or *rare* by the IUCN. Since these taxa are either in serious decline or already at very low and precarious population levels, any exploitation of them threatens their continued survival. Therefore, the ECG and WHO strongly recommend that:

(1) *endangered, vulnerable* and *rare* species be considered for use in biomedical research projects only if they are obtained from existing self-sustaining captive breeding colonies (i.e., in captive breeding, all animals are required to be at least F2 generation);

(2) species categorized as *status unknown* or *indeterminate* also not be considered for use in such research projects until adequate data indicate that they are not *endangered, vulnerable* or *rare.*

Members of more than 30 species of nonhuman primates, the majority of them wild-caught, are currently being used worldwide in biomedical research and testing. However, sustained yield trapping strategies for wild primates, based on long-term ecological field studies and adequate demographic data, have not yet been developed for any primate species. Continuing habitat loss in most areas where primates occur makes demographic projections difficult and unreliable in most cases. The ECG and WHO therefore recommend that:

(1) wild-caught primates be used primarily for the establishment of self-sustaining captive breeding colonies, the eventual goal of which should be to captive-breed most or all (depending on species) of the primates used in research;

(2) populations of the apparently common primate species be trapped only in:

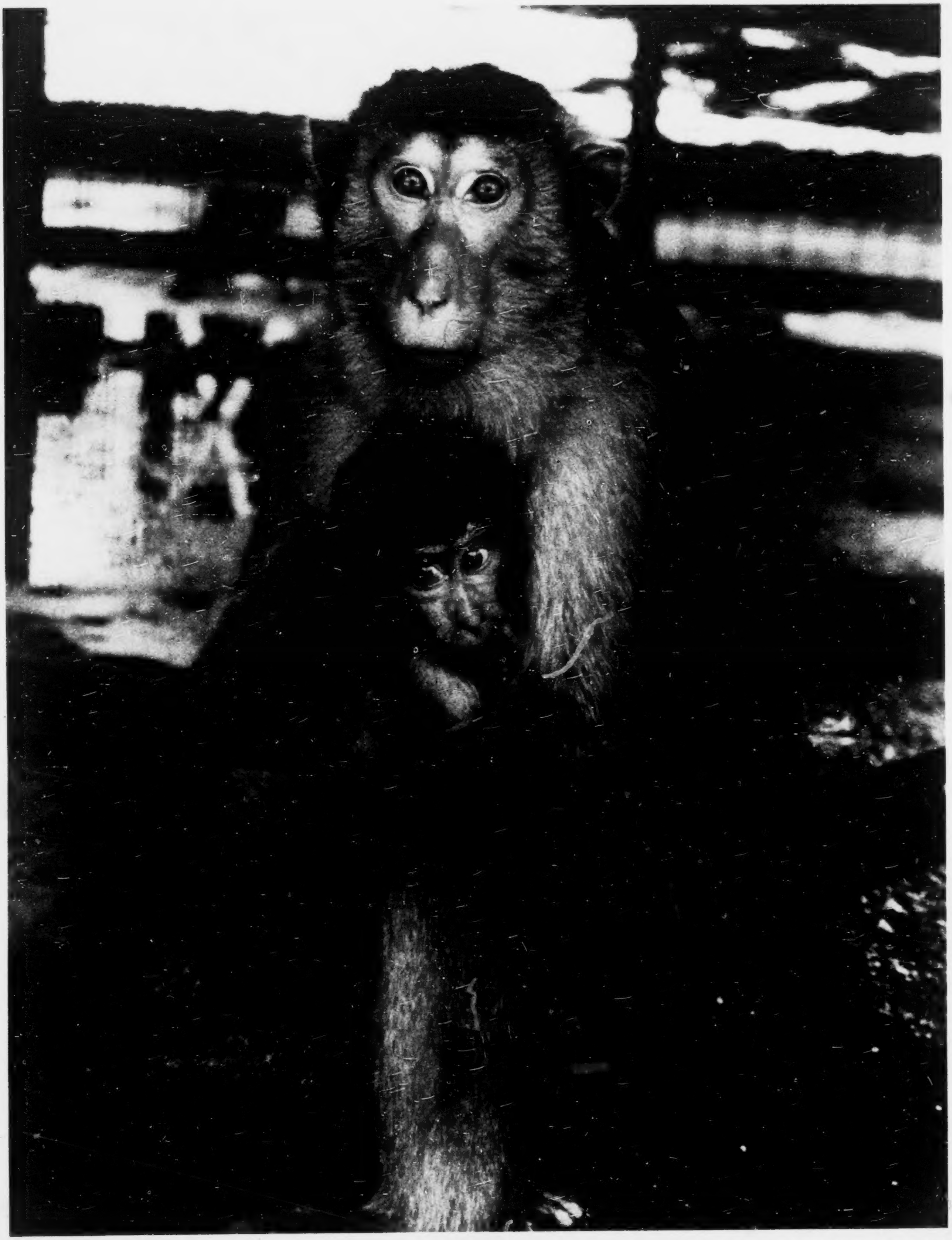
  (a) special management areas where demographic data are available, where the populations are continually monitored to avoid overexploitation, and where sustained yield trapping strategies are being developed and tested;

  (b) areas where the animals are living in agricultural or other man-modified environments and have been shown to be agricultural nuisances that would otherwise be destroyed; or

  (c) areas where the habitat is already being destroyed, where the primates would otherwise be killed or would die from starvation or stress, and where translocation is not a viable alternative.

To minimize impact on free-living populations, the ECG and WHO urge that trapping, holding and shipping techniques be perfected to the point that accidental death, destruction of habitat, disruption of family groups, and other forms of wastage are kept to an absolute minimum.

The ECG and WHO urge researchers and their funding agencies to assist in the control of international commerce in primates by requiring proper export and import documentation on all animals that they purchase or otherwise obtain, and to refuse animals obtained in contravention of CITES and/or protective legislation in the source countries.



The primate genus *Macaca* has been the most prominent in the primate trade. The species depicted here is the pig-tailed macaque (*Macaca nemestrina*) from southeast Asia. It was exported mainly from Indonesia and Malaysia, but in smaller numbers than the long-tailed macaque, also from southeast Asia, or the Indian rhesus monkey.

A Synopsis of Legislation and the Primate Trade in Habitat and User Countries

Michael Kavanagh
and
Elizabeth Bennett

I. Introduction

In this chapter, we present summary information about such national legislation and international legal cooperation as has affected the international trade in nonhuman primates. In order to illustrate the effects of laws and agreements on the primate trade, we list the species present in each country and comment on recent national trading histories.

The wildlife trade is a diverse and often secretive business, no less so when it concerns primates. In consequence, our sources are very often in the form of personal communications, some of which have been given on the understanding that their origin should not be revealed. Between early 1979 and 1982, hundreds of letters of inquiry were sent out in an attempt to contact knowledgeable persons in every single country that might be involved in the primate trade. Wherever "pers. comm." followed by a date is given as a reference in the text, a written communication, or a record of a verbal communication, is deposited in the files of the Wildlife Trade Monitoring Unit (WTMU) of the IUCN Conservation Monitoring Centre in Cambridge, England. For a more complete review of the wildlife trade, the reader is referred to Inskipp & Wells (1979), from which much of the following general information is abstracted.

II. International Agreement: the Washington Convention

Throughout the 1960's, there was a growing move within the International Union for Conservation of Nature and Natural Resources (IUCN) to protect wildlife in habitat countries by restricting the importation into other countries of threatened species and their products. At the 7th General Assembly of IUCN in Warsaw in 1960, governments were urged to restrict such imports in line with the laws of the countries of origin (Inskipp & Wells, 1979). These moves gathered momentum, particularly in response to drafts of what became the Washington Convention. These drafts were sent by IUCN to various governments for consideration.

In early 1973, 80 participant and seven observer states met in Washington, D.C., and on March 3rd, 21 nations signed the Convention on International Trade in Endangered Species of Wild Fauna and Flora. This is commonly known as CITES or the Washington Convention. It came into force on July 1, 1975, having by then been duly ratified by more than the required ten countries, the minimum number that was necessary to bring it into effective existence.

Inskipp & Wells (1979) have described what the convention says as follows:

"According to its preamble, the signatories to CITES recognize 'that wild fauna and flora in their many beautiful and varied forms are an irreplaceable part of the natural systems of the earth.'

They also recognize 'that international co-operation is essential for the protection of certain species of wild fauna and flora against over-exploitation through international trade.'"

The aim of the convention is to establish worldwide controls over trade in endangered wildlife and wildlife products. The convention itself is deposited with the Swiss government, and has texts in five languages: Chinese, English, French, Russian and Spanish. It consists of 25 articles:

ARTICLE I defines the terms used in the convention. In particular it states that the convention covers animals or plants alive or dead, plus 'any readily recognizable part or derivative thereof. . .'

ARTICLE II outlines fundamental principles. Species are listed in three appendices: Appendix I lists species threatened with extinction. Appendix II lists species not yet threatened but which could become endangered if trade is not controlled. Species are also included on Appendix II if they are difficult to distinguish from other species on Appendix I or II. (This is to make it more difficult for illegal trade to take place through misidentification or mislabelling.) Appendix III lists species which individual states protect nationally and over which they want the co-operation of other states.

ARTICLE III regulates trade in Appendix I species. An export permit from the country of [export] and an import permit from the country of importation are required. These permits are issued by national management authorities, provided that (the animal's [or plant's]) removal from its country of origin will not be detrimental to the survival of the species, and that the motive is not for primarily commercial purposes. Live specimens must be properly shipped and housed.

ARTICLE IV regulates trade in Appendix II species. Regulations are less strict than for Appendix I. A permit from the country of [export] is required but not an import permit. Conditions are similar to Appendix I species, but there is no restriction on the specimen's use for commercial purposes. Appendix II helps to monitor the trade. Each national scientific authority must record the export permits granted by its country for Appendix II specimens.

ARTICLE V regulates trade in Appendix III species. Imports require a certificate of origin; and if the import is from the state that has included the species on Appendix III, an export permit is required. (Appendix III is not yet used much. It could be useful for generally widespread species which are rare in some countries — for example, the natterjack toad and sand lizard, which although widespread in Europe are now rare in Britain and Scandinavia).

ARTICLE VI concerns the format of permits and certificates. A separate permit is required for each consignment; an export permit is only valid for six months.

ARTICLE VII relates to exemptions, for which the usual controls on trade need not always apply. Exemptions include:

- a specimen acquired before the convention came into force.
  (This has led to considerable problems of stockpiling.)
- the re-import of personal property or household effects.
- Appendix I species bred in captivity or plants artificially propagated are to be treated as Appendix II species.
- the non-commercial loan and exchange of specimens between scientists and museums, etc. (This has led to problems in enforcement.)
- specimens which form part of travelling zoos, circuses or exhibitions.

ARTICLE VIII describes enforcement, which is the exclusive responsibility of member states. Penalties may include fines, imprisonment, the confiscation of specimens, or their return to the site of export. Rescue centers must be provided for confiscated live specimens. (This has presented considerable problems; very few centers have been set up.) Certain ports can be designated for the exit and entry of convention specimens. Records of trade are to be maintained and reported to the CITES Secretariat.

ARTICLE IX describes the management authorities and scientific authorities which each state must have. The management authority is responsible for issuing permits, subject to advice from its scientific authority. The scientific authority is expected to notify the CITES Secretariat if it believes trade in any species should be limited.

(A management authority is generally a government department. In the U.K. it is the Department of the Environment; in the U.S.A., the Federal Wildlife Permit Office of the Fish and Wildlife Service Department of the Interior; in Papua New Guinea, the Conservator of Fauna at the Department of Natural Resources; Nepal has two: the Chief National Park and Wildlife Conservation Office for fauna and the Director General of the Department of Botany for flora; in Ghana it is the Department of Game and Wildlife.)

(Scientific authorities include scientists from institutions, museums, or government departments. The scientific authority in the U.S.A. has representatives from seven federal agencies. In the U.K. there are two scientific authorities: the Nature Conservancy Council for animals and the Royal Botanic Gardens at Kew for plants. India has three scientific authorities: the Botanical Survey of India, the Zoological Survey of India, and the Central Marine Fisheries Research Institute.)

ARTICLE X states that where trade is with a non-CITES country, comparable documents to those required by the convention may be accepted.

ARTICLE XI requires meetings of the parties every two years to review the working of the convention and amend the appendices. UN agencies and non-member states may attend and speak as observers. Other non-governmental organizations, international or (if approved by their government) national, may do the same unless one third of the parties objects.

ARTICLE XII concerns the Secretariat, at present provided by the United Nations Environment Program . . . . [Presently, the parties provide funding for the Secretariat.]

ARTICLE XIII provides for communication between parties and the Secretariat when a species is being adversely affected by trade.

ARTICLE XIV states that CITES has no effect on domestic legislation or on other international conventions. States may enforce stricter domestic measures.

ARTICLE XV deals with amendments to Appendices I and II. Any party may propose an amendment for consideration at a meeting of the parties, provided the text has been circulated 150 days in advance. Other states' comments are circulated 30 days in advance. An amendment is adopted by two thirds majority; it comes into force 90 days after the meeting. At the first meeting of the parties (in Berne, Switzerland, 1976), 42 species or other groups were added to Appendix I, and 72 to Appendix II. Three were deleted from Appendix I and six from Appendix II.

Amendments may also be made between meetings, by a postal vote in which at least half the parties must vote. (So far this method has been little used, but it is essential if action is to be taken rapidly as species become threatened. The guanaco was added to Appendix II in this way in August 1978.)

ARTICLE XVI describes procedures for amendments to Appendix III. Any party may submit a list of species for Appendix III. This list is sent as quickly as possible to other parties, and takes effect 90 days later.

ARTICLE XVII provides for the amendment of the convention through an extraordinary meeting of the conference of the parties.

ARTICLE XVIII provides for the resolution of disputes between parties.

ARTICLE XIX, XX and XXI concern signature, ratification and accession. The Washington Convention was open for signature from 3 March, 1973 to 31 December, 1974. States which signed may ratify the convention at any time. (States which were not original signatories may accede to the Convention; they do not need to ratify — they should not be allowed to accede until they have passed legislation to implement CITES.)

ARTICLE XXII states that the Convention comes into force 90 days after the country has ratified or acceded.

ARTICLE XXIII states that any party may place a specific reservation on one or more species on any of the three Appendices, and on parts and derivatives of Appendix III species. [Japan and France have reservations on some of the marine turtles; Japan, Norway and U.S.S.R. have reservation on most whales; and France and Italy have reservations on some crocodiles on Appendix I.]

Legislation in Habitat and User Countries

ARTICLE XXIV and XXV refer to the denunciation of the Convention (i.e. withdrawal) by any party, and describe the depository government."

The 86 countries that have acceded to or ratified CITES up through May 1984, are listed in Table 1. Table 2 gives a list of those countries that have not joined CITES.

Administration of the Convention is handled by a secretariat that is located at IUCN's headquarters in Gland, Switzerland.[1] Funding for the secretariat was originally supplied by the United Nations Environment Program, but this is now being taken over by contributions from member states.

As well as housing the secretariat, IUCN provides both the administrative and technical support that is required for meetings of CITES parties and also expert advice through its Species Survival Commission (SSC) and other units. The SSC, which was formerly known as the Survival Service Commission, draws its expertise from a number of specialist groups, of which the Primate Specialist Group (PSG) is one. All of the chairmen of the specialist groups are members of the SSC itself and it is each one's

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[1] The CITES Secretariat moved out of IUCN headquarters in Gland as of November 1, 1984, and is now housed with UNEP in Lausanne.

TABLE 1

CITES PARTIES AND THE DATES UPON WHICH THE CONVENTION ENTERED INTO FORCE. (CURRENT LIST AS OF MAY, 1984.)

1.	United States of America	01-07-75
2.	Nigeria	01-07-75
3.	Switzerland	01-07-75
4.	Tunisia	01-07-75
5.	Sweden	01-07-75
6.	Cyprus	01-07-75
7.	United Arab Emirates	01-07-75
8.	Ecuador	01-07-75
9.	Chile	01-07-75
10.	Uruguay	01-07-75
11.	Canada	09-07-75
12.	Mauritius	27-07-75
13.	Nepal	16-09-75
14.	Peru	25-09-75
15.	Costa Rica	28-09-75
16.	South Africa	13-10-75
17.	Brazil	04-11-75
18.	Madagascar	18-11-75
19.	Niger	07-12-75
20.	German Democratic Republic (= East Germany)	07-01-76
21.	Morocco	14-01-76
22.	Ghana	12-02-76
23.	Papua New Guinea	11-03-76
24.	Federal Republic of Germany (= West Germany)	20-06-76
25.	Pakistan	19-07-76
26.	Finland	08-08-76
27.	India	18-10-76
28.	Zaire	18-10-76
29.	Norway	25-10-76
30.	Australia	27-10-76
31.	United Kingdom of Great Britain & Northern Ireland	31-10-76
32.	Iran	01-11-76
33.	Union of Soviet Socialist Republics	08-12-76
34.	Paraguay	13-02-77
35.	Seychelles	09-05-77
36.	Guyana	25-08-77
37.	Denmark	24-10-77
38.	Senegal	03-11-77
39.	Nicaragua	04-11-77
40.	Gambia	24-11-77
41.	Malaysia	18-01-78
42.	Venezuela	22-01-78
43.	Botswana	12-02-78
44.	Egypt	04-04-78
45.	Monaco	18-07-78
46.	France	09-08-78
47.	Panama	15-11-78
48.	Togo	21-01-79
49.	Kenya	13-03-79
50.	Jordan	14-03-79
51.	Indonesia	28-03-79
52.	Sri Lanka	02-08-79
53.	Bahamas	18-09-79
54.	Bolivia	04-10-79
55.	Italy	31-12-79
56.	Guatemala	05-02-80
57.	Tanzania	27-02-80
58.	Liechtenstein	28-02-80
59.	Israel	17-03-80
60.	Japan	04-11-80
61.	Central African Republic	25-11-80
62.	Rwanda	18-01-81
63.	Suriname	15-02-81
64.	Zambia	22-02-81
65.	Portugal	11-03-81
66.	Argentina	08-04-81
67.	China	08-04-81
68.	Liberia	09-06-81
69.	Mozambique	23-06-81
70.	Zimbabwe	17-08-81
71.	Cameroon	03-09-81
72.	Philippines	16-11-81
73.	Colombia	29-11-81
74.	Guinea	20-12-81
75.	Bangladesh	18-02-82
76.	Austria	27-04-82
77.	Malawi	06-05-82
78.	Sudan	23-01-83
79.	Saint Lucia	15-03-83
80.	Thailand	21-04-83
81.	Congo	01-05-83
82.	Belgium	01-01-84
83.	Algeria	21-02-84
84.	Luxembourg	12-03-84
85.	Trinidad & Tobago	19-04-84
86.	Benin	28-05-84

responsibility to see that the SSC has access to the necessary expertise in his or her field. The current chairman of the Primate Specialist Group is Dr. R.A. Mittermeier. For a brief summary of IUCN's structure and its involvement in primate conservation, see Harrisson (1975), and for a review of the activities of the Primate Specialist Group, see Mittermeier (1981). The PSG also produces a newsletter, which appears twice a year.

In addition to the specialist groups, the IUCN has also established the Conservation Monitoring Centre in Cambridge, England. This includes the Species Conservation Monitoring Unit which is responsible, among other things, for the production of the Red Data Books. Since these bring together information about the conservation status of threatened species, they play an important role in deciding which species will be listed in the CITES appendices. The latest IUCN Mammal Red Data Book (IUCN, 1982) includes up-to-date information on threatened Neotropical primates. That on threatened Old World primates will be published in book form in the very near future (IUCN, in prep.) and is currently available in loose-leaf format (IUCN, 1978).

TABLE 2.
STATES THAT HAD NOT JOINED CITES AS OF MAY, 1984.

- Afghanistan
- Albania
- Angola
- Bahrain
- Barbados
- Belgium
- Belize
- Bhutan
- Bulgaria
- Burma
- Burundi
- Cape Verde
- Chad
- Comoros
- Cuba
- Czechoslovakia
- Democratic Kampuchea
- Democratic People's Republic of Korea (= North Korea)
- Democratic Yemen (= South Yemen)
- Djibouti
- Dominica
- Dominican Republic
- El Salvador
- Equatorial Guinea
- Ethiopia
- Fiji
- Gabon
- Greece
- Grenada
- Guinea-Bissau
- Haiti
- Honduras
- Hungary
- Iceland
- Iraq
- Ireland
- Ivory Coast
- Jamaica
- Kiribati
- Kuwait
- Lao People's Democratic Republic
- Lebanon
- Lesotho
- Libyan Arab Jamahiriya
- Maldives
- Mali
- Malta
- Mauritania
- Mexico
- Mongolia
- Namibia
- Nauru
- Netherlands
- New Zealand
- Oman
- Poland
- Qatar
- Republic of Korea (= South Korea)
- Romania
- Saint Lucia
- Saint Vincent and the Grenadines
- Samoa
- San Marino
- Sao Tome and Principe
- Saudi Arabia
- Sierra Leone
- Singapore
- Solomon Islands
- Somalia
- Spain
- Swaziland
- Syrian Arab Republic
- Taiwan
- Thailand
- Tonga
- Turkey
- Tuvalu
- Uganda
- Upper Volta
- Vanuatu
- Vietnam
- Yemen (= North Yemen)
- Yugoslavia

The Conservation Monitoring Centre also includes the Wildlife Trade Monitoring Unit (WTMU), the successor to TRAFFIC (International) (Trade Records Analysis of Flora and Fauna in Commerce). TRAFFIC was established in 1976 to monitor international trade in plants and animals, particularly with reference to CITES. In addition to WTMU, there are now three active national TRAFFIC organizations that are primarily concerned with their own countries' imports and exports: these are in West Germany, the U.S.A. and Japan[2]. There was a TRAFFIC (U.K.) but it ceased to exist when WTMU came into being and its functions were taken over by WTMU. There is also a TRAFFIC (East Africa), which is based in Nairobi, but it is no longer active due to the sad death of its volunteer director, Mr. C.E. Norris. As well as acting as watchdogs of the international trade in flora and fauna, WTMU and TRAFFIC (U.S.A.) both produce regular news bulletins and conduct in-depth investigations, such as the present one on the primate trade.

The most obvious success of CITES lies in getting many countries to join so quickly. However, the actual enforcement of the provisions of the convention is carried out by the individual governments concerned, and it is perhaps inevitable that this is far from perfect. Some of these imperfections are apparent from the national synopses that we present in this chapter, but an overall assessment of the effects of CITES on the international primate trade is dealt with in the concluding chapter of this volume.

Present and past listings of primates on the CITES Appendices are given in Table 3.

III. Species, Legislation and Trade in Individual Countries

In this section, each habitat and user country is dealt with separately. We include all countries that are known to have wild or feral primates and all other countries for which there is any evidence of involvement in the trade. For information about indigenous and introduced primates in each country, we have relied on Barzdo & Inskipp (1982), plus those additional references that are listed where appropriate. Nomenclature generally follows Barzdo & Inskipp (1982), since they have tried to follow CITES nomenclature as much as possible. Subspecific divisions that are of no relevance to the trade have been ignored. Tree shrews, order Scandentia (Eisenberg, 1981), are not included as primates. Endemic taxa are marked with asterisks(*).

Countries that are parties to CITES as of May 31, 1984, are

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[2] New offices have been set up in Australia, Belgium, the Netherlands and Uruguay.

TABLE 3.
PRIMATES CURRENTLY AND FORMERLY LISTED IN THE CITIES APPENDICES (INCORPORATING RESOLUTIONS PASSED AT THE 4TH MEETING OF THE PARTIES IN BOTSWANA, MARCH, 1983).

APPENDIX I (current listing)

Cheirogaleidae
Allocebus spp. Hairy-eared dwarf lemurs (75)
Cheirogaleus spp. Dwarf lemurs (75)
Microcebus spp. Mouse lemurs (75)
Phaner spp. Fork-marked dwarf lemurs (75)

Lemuridae
Hapalemur spp. Gentle lemurs (75)
Lemur spp. Lemurs (75) (except *L. catta*)
Lemur catta Ring-tailed lemur (77)
Lepilemur spp. Sportive lemurs (75)

Indriidae
Lichanotus (= Avahi) spp. Woolly lemurs (75)
Indri spp. Indris (75)
Propithecus spp. Sifakas (75)

Daubentoniidae
Daubentonia madagascariensis Aye-aye (75)

Callitrichidae
Callithrix aurita Buffy-tufted-ear marmoset (77)
Callithrix flaviceps Buffy-headed marmoset (77)
Leontopithecus (= *Leontideus*) spp. Golden lion tamarins (75)
Saguinus bicolor Pied tamarin (77)
Saguinus leucopus White-footed tamarin (77)
Saguinus oedipus (geoffroyi) Rufous-naped tamarin (81)

Callimiconidae
Callimico goeldii Goeldi's marmoset (75)

Cebidae
Alouatta palliata (incl. *villosa*) Mantled howler (75)
Ateles geoffroyi frontatus Black-browed spider monkey (75)
Ateles geoffroyi panamensis Red spider monkey (75)
Brachyteles arachnoides Woolly spider monkey (75)
Cacajao spp. Uakaris (75)
Chiropotes albinasus Red-nosed saki (75)
Lagothrix flavicauda Yellow-tailed woolly monkey (83)
Saimiri oerstedii Red-backed squirrel monkey (75)

Cercopithecidae
Cercocebus galeritus galeritus Tana River mangabey (75)
Cercopithecus diana (incl. *roloway*) Diana monkey (81)
Colobus pennantii kirkii Zanzibar red colobus (75)
Colobus rufomitratus Tana River red colobus (75)
Macaca silenus Lion-tailed macaque (75)
Nasalis spp. Proboscis monkey (75) and pig-tailed leaf monkey or simakobu (75)
Papio (= Mandrillus) leucophaeus Drill (81)
Papio (= Mandrillus) sphinx Mandrill (81)
Presbytis entellus Grey langur (75)
Presbytis geei Golden langur (75)
Presbytis pileata Capped langur (75)
Presbytis potenziani Mentawai langur (77)
Pygathrix nemaeus Douc (75)
Hylobates spp. Gibbons (75)

Pongidae Great Apes (77)

APPENDIX II (current listing)

Primates spp. All primates except those listed on Appendix I (77)

Amendments

Lemur catta Ring-tailed lemur - listed in App. II from 75 to 77.
Cebuella pygmaea Pygmy marmoset - listed in App. I from 77 to 79.
Gorilla gorilla Gorilla - listed in App. I from 75 to 77.
Pongo pygmaeus abelii Sumatran orang-utan - listed in App. I from 75 to 77.
Pongo pygmaeus pygmaeus Bornean orang-utan - listed in App. I from 75 to 77.
Pan paniscus Pygmy chimpanzee - listed in App. II from 75 to 77.
Pan troglodytes Chimpanzee - listed in App. II from 75 to 77.

The following species were listed separately in App. II from 75 to 77. Since then, they have been included therein under Primates spp.:

Loris tardigradus Slender loris
Nycticebus coucang Slow loris
Cebus capucinus White-faced capuchin
Colobus badius gordonorum Uhehe red colobus
Colobus verus Olive colobus
Macaca sylvanus Barbary macaque
Presbytis johnii Nilgiri langur
Rhinopithecus roxellanae Golden snub-nosed monkey

The following species were listed separately in App. III from 75 to 77. Since then, they have been transferred to App. II, where they are included under Primates spp.:

Galago senegalensis Lesser bushbaby
Galagoides demidovii Dwarf bushbaby
Perodicticus potto Potto
Cercopithecus aethiops Green monkey
Cercopithecus diana Diana monkey (since transferred to App. I)
Cercopithecus mona Mona monkey
Cercopithecus petaurista Lesser white-nosed guenon
Colobus polykomos Western black-and-white colobus
Erythrocebus patas Patas monkey

Key:
75 = listing effective from 1 July, 1975
77 = listing effective from 4 February, 1977
79 = listing effective from 28 June, 1979
81 = listing effective from 6 June, 1981
83 = listing effective from 29 July, 1983

Scientific names and dates of listings from The CITES Listings on Appendices I, II and III, suppl. to TRAFFIC Bulletin (1982), and amendments implemented after the Meeting of the Parties, Botswana, 1983.

marked with a cross (+), and a synopsis is given of such relevant legal information as is available. Due to the difficulties involved in tracking down and verifying this information, much of what is presented is perhaps out of date and many of the national pictures are incomplete. However, we know of no other source that attempts to bring together a description of the many laws that relate to the primate trade. For details of CITES management and scientific authorities, readers should consult the CITES Directory, compiled by the CITES secretariat.

In the final paragraph under each country, we give a very brief summary of its recent trading history, so far as it is known. We do not comment on a number of obvious discrepancies between national laws and national trading practices. Neither do we include captive breeding in our summaries, since this is dealt with elsewhere in this volume.

A. Africa

+ **Algeria:** *Macaca sylvanus.*

Legislation that is currently in preparation will give total protection to the Barbary macaque, banning hunting, trapping and selling except under license (H. Meziane, pers. comm., 1982).

Algeria does not trade in primates but some Barbary macaques are used in research laboratories at the Pasteur Institute (H. Meziane & B. Asselah, pers. comm., 1982).

Angola:
Arctocebus calabarensis.
Cercocebus aterrimus.
Cercopithecus aethiops,
  C. ascanius, C. cephus,
  C. mitis, C. neglectus,
  C. nictitans.
Colobus angolensis.
Euoticus elegantulus.
Galago alleni, G. crassicaudatus,
  G. demidovii, G. senegalensis.
Gorilla gorilla.
Miopithecus talapoin.
Pan troglodytes.
Papio cynocephalus, P. ursinus.
Perodicticus potto.
(M.J. Braga, pers. comm., 1982)

A complete ban on the export of primates is enforced by the National Office for the Conservation of Nature and no exports have been authorized since independence in November, 1975 (M.J. Braga, pers. comm., 1982).

There is no evidence of any Angolan primate trade apart from a Japanese record of the importation of 20 primates from Angola in 1974 (Kavanagh, this volume). Primates are hunted for their meat and killed as agricultural pests (M.J. Braga, pers. comm., 1982).

+ **Benin:**
Cercopithecus aethiops, C. mona,
  C. nictitans, C. petaurista.
Colobus polykomos, C. verus.
Erythrocebus patas.
Galago demidovii, G. senegalensis.
Papio anubis.
Perodicticus potto.
(Teleki and Baldwin, 1979.)

With the exception of baboons, all primates are legally protected (A. Szaniawski, pers. comm., 1981).

No known trade, although primates are hunted for their meat (A. Szaniawski, pers. comm., 1981).

+ **Botswana:**
Cercopithecus aethiops.
(Galago crassicaudatus?),
  G. senegalensis.
(Papio cynocephalus?), P. ursinus.
(Dorst and Dandelot, 1972).

All primates are legally protected, although export permits may occasionally be granted by the Department of Veterinary Services (J. Stewart, pers. comm., 1980).

Botswana is known to have exported primates to Japan, U.K. and U.S.A. since 1970. Although the numbers involved are relatively small, Botswana appears to be an important source of bushbabies (Kavanagh, this volume; Mack & Eudey, this volume).

Burundi:
Cercocebus albigena.
Cercopithecus aethiops, C. l'hoesti,
  C. mitis.
Colobus angolensis, C. badius.
Galago crassicaudatus.
Pan troglodytes.
Papio anubis.
Perodicticus potto.
(P.D. Jenkins, pers. comm., 1982)

The export of primates is illegal (WTMU files, 1975).

No known trade.

+ **Cameroon:**
Arctocebus calabarensis.
Cercocebus albigena, C. galeritus,
  C. torquatus.
Cercopithecus aethiops, C. cephus,
  C. erythrotis, C. mona,
  C. neglectus, C. nictitans,
  C. pogonias, C. preussi.
Colobus badius, C. guereza,
  C. satanas.
Erythrocebus patas.
Galago alleni, G. demidovii,
  G. senegalensis.

Gorilla gorilla.
Miopithecus talapoin.
Pan troglodytes.
Papio anubis, P. leucophaeus, P. sphinx.
Perodicticus potto.
(Dorst & Dandelot, 1972).

It is illegal to trap or to export gorillas. Permits are required to trap or to export any other species of primates (A.A. Allo, pers. comm., 1980).

Small numbers of primates have occasionally been exported from Cameroon since 1965. This continues up to the present time (Kavanagh, this volume; Mack & Eudey, this volume), but the only real significance of the trade from Cameroon lies in the possibility that gorillas may be exported (A.A. Allo, pers. comm., 1980; Lean, 1979). Many primates are hunted for their meat in the forest zone (Kavanagh, pers. obs., 1975).

Canary Islands (Spain): *Miopithecus talapoin* (introduced).

Primates which are declared to be domestic pets may be imported freely. Primates which are imported for commercial purposes require a permit from the Ministry of Commerce (B. Templer, pers. comm., 1982).

There is no known trade in monkeys. However, baby chimpanzees are regularly imported, mainly from Equatorial Guinea but also from other countries such as Sierra Leone and Belgium. These chimpanzees are used in the lucrative beach photography trade (B. Templer, pers. comm., 1982; Anon., 1982a).

Cape Verde Islands: *Cercopithecus aethiops* (introduced).

No known trade.

+ Central African Republic:

Arctocebus calabarensis.
Cercocebus albigena, C. galeritus.
Cercopithecus aethiops, C. ascanius, C. mona, C. neglectus, C. nictitans, C. pogonias.
Colobus guereza.
Erythrocebus patas.
Gorilla gorilla.
Pan troglodytes.
Papio anubis.
Perodicticus potto.
(Dorst & Dandelot, 1972; P.D. Jenkins, pers. comm., 1982).

All apes and colobus monkeys are totally protected. A license is required for the trapping and export of any other primates (C.A. Spinage, pers. comm., 1980).

There is no known trade, although an occasional chimpanzee or pet monkey may leave the country (C.A. Spinage, pers. comm., 1980).

Chad:

Cercopithecus aethiops.
Colobus guereza.
Erythrocebus patas.
Galago alleni, G. senegalensis.
Papio anubis.
(Dorst & Dandelot, 1972; P.D. Jenkins, pers. comm., 1982)

Chad exports a few primates, including patas monkeys to the U.K. and U.S.A. (Kavanagh, this volume; Mack & Eudey, this volume).

Comoro Islands: *Lemur fulvus, L. mongoz.* (Tattersall, 1977).

Since 1974, it has been illegal to kill lemurs or to keep them without a license, and exports are restricted to a maximum of ten females and twenty males per year (Tattersall, 1977).

Virtually no known trade, but see Mack & Eudey (this volume).

+ Congo:

Allenopithecus nigroviridis.
Arctocebus calabarensis.
Cercocebus albigena, C. galeritus, C. torquatus.
Cercopithecus aethiops, C. cephus, C. neglectus, C. nictitans, C. pogonias.
Colobus angolensis, C. badius, C. guereza.
Euoticus elegantulus.
Galago alleni, G. demidovii.
Gorilla gorilla.
Miopithecus talapoin.
Pan troglodytes.
Papio anubis, P. sphinx.
Perodicticus potto.
(Dorst & Dandelot, 1972; P.D. Jenkins, pers. comm., 1982).

No known trade.

Djibouti: No wild or feral primates.

The U.S.A. imported very small numbers of primates from Djibouti in 1976 and 1980 (Mack & Eudey, this volume).

+ **Egypt:** No wild or feral primates.

No known trade apart from the import of one green monkey from Uganda in 1981 and a few primates from the U.K. for zoo display (Kavanagh, this volume).

Equatorial Guinea:

Arctocebus calabarensis.
Cercocebus albigena,
C. galeritus, C. torquatus.
Cercopithecus cephus,
C. erythrotis, C. neglectus,
C. nictitans, C. pogonias,
C. preussi.
Euoticus elegantulus.
Galago alleni, G. demidovii.
Gorilla gorilla.
Miopithecus talapoin.
Pan troglodytes.
Papio leucophaeus, P. sphinx.
Perodicticus potto.
(Dorst & Dandelot, 1972;
P.D. Jenkins, pers. comm., 1982).

Gorillas are totally protected under the law but there is no enforcement of this (Sabater Pi, 1980/81).

Equatorial Guinea is known to be a major source of young chimpanzees that are used in the beach photography trade in Spain (B. Templer, pers. comm., 1982).

Ethiopia:

Cercopithecus aethiops, C. mitis,
C. neglectus.
Colobus guereza.
Erythrocebus patas.
Galago senegalensis.
Papio anubis, P. cynocephalus,
P. hamadryas.
*Theropithecus gelada**.
(P.D. Jenkins, pers. comm., 1982).

Ethiopia has been a major primate exporting country since at least 1964 (Kavanagh, this volume; Mack & Eudey, this volume). Although American imports have dropped markedly since the mid-1970's, large numbers of hamadryas baboons and green monkeys are still being sent to U.S.S.R. (C.E. Norris, pers. comm., 1981).

Gabon:

Arctocebus calabarensis.
Cercocebus albigena, C. galeritus,
C. torquatus.
Cercopithecus cephus, C. mona,
C. neglectus, C. nictitans,
C. pogonias.
Colobus badius, C. guereza,
C. satanas.
Euoticus elegantulus.
Galago alleni, G. demidovii.
Gorilla gorilla.
Miopithecus talapoin.
Pan troglodytes.
Papio sphinx.
Perodicticus potto.
(Dorst & Dandelot, 1972;
R.W. Cooper, pers. comm., 1982).

Primates may be exported with a permit from the Director of Wildlife and Hunting (R. Dipouma, pers. comm., 1982).

In recent years, there have been very few exports, amounting to less than twenty primates per year, mainly monkeys but also chimpanzees and gorillas under license (R. Dipouma, pers. comm., 1982). All but the smallest primates are frequently hunted for their meat (A. Gautier-Hion, pers. comm., 1980), and chimpanzees and gorillas are used within Gabon for research into human fertility (Anon., 1980a). Gabon imported long-tailed macaques from U.K. in 1981 (R.E. Hackett, pers. comm., 1982) and mangabeys from France in 1979 (Kavanagh, this volume).

+ **Gambia:**

Cercopithecus aethiops, C. mona.
Colobus badius.
Erythrocebus patas.
Galago senegalensis.
Pan troglodytes (extinct, but reintroduced to one island).
Papio papio.
(P. Steele, pers. comm., 1982).

The Wildlife Conservation Act (1977) bans all hunting, capture and trade in primates, except in defense of crops or other property (P. Steele, pers. comm., 1982).

There may be some illegal exports of *E. patas* and *P. papio* by Senegalese traders but certainly not at a high level. *P. troglodytes* very occasionally passes through Gambia illegally *en route* from Guinea and Guinea-Bissau. Hunting of primates for meat is rare (P. Steele, pers. comm., 1982). Gambia occasionally imports chimpanzees for rehabilitation.

+ **Ghana:**

Cercocebus torquatus.
Cercopithecus aethiops,
C. campbelli, C. diana,
C. mona, C. petaurista.

Colobus badius, C. polykomos,
C. verus.
Erythrocebus patas.
Galago demidovii, G. senegalensis.
Pan troglodytes.
Papio anubis.
Perodicticus potto.
(Gartlan, 1982).

Under the Wildlife Conservation Regulations 1971, chimpanzees, colobus monkeys, diana guenons and galagos are all totally protected from hunting, trapping and export. Other primate species may be exported with a license from the Chief Game and Wildlife Officer (WTMU files, 1971).

Ghana has exported a very small number of primates since 1964 (Kavanagh, this volume; Mack & Eudey, this volume), but domestic consumption of primate meat is widespread (Gartlan, 1982: S.M. Jeffrey, pers. comm., 1980).

+ Guinea:

Cercocebus torquatus.
Cercopithecus aethiops,
C. campbelli, C. nictitans,
C. petaurista.
Colobus badius, C. polykomos,
C. verus.
Erythrocebus patas.
Galago demidovii, G. senegalensis.
Pan troglodytes.
(Papio anubis?), P. papio.
Perodicticus potto.
(Dorst & Dandelot, 1972;
P.D. Jenkins, pers. comm.,
1982).

Prior to the mid-1970's, Guinea was a major source of chimpanzees, but since then it has played no role in the international primate trade other than that of a probable source of chimpanzees that are smuggled into Sierra Leone (Teleki & Baldwin, 1979).

Guinea-Bissau:

Cercopithecus aethiops,
C. campbelli, C. nictitans,
C. petaurista.
Colobus badius.
Erythrocebus patas.
Galago senegalensis.
Pan troglodytes.
Papio papio.
Perodicticus potto.
(Dorst & Dandelot, 1972;
Teleki & Baldwin, 1979).

No known trade.

Ivory Coast:

Cercocebus torquatus.
Cercopithecus aethiops,
C. campbelli, C. diana,
C. mona, C. nictitans,
C. petaurista.
Colobus badius, C. polykomos,
C. verus.
Erythrocebus patas.
Galago demidovii, G. senegalensis.
Pan troglodytes.
Papio anubis.
Perodicticus potto.
(Dorst & Dandelot, 1972).

The hunting, capture and export of all wild animals is illegal, apart from "exceptional cases" that may be granted special licenses (WTMU files, 1974).

No known export trade.

+ Kenya:

Cercocebus galeritus.
Cercopithecus aethiops,
C. ascanius, C. mitis,
C. neglectus.
Colobus angolensis, C. badius,
C. guereza,
Erythrocebus patas.
Galago crassicaudatus,
G. demidovii, G. senegalensis.
Papio anubis, P. cynocephalus.
(T.T. Struhsaker, pers. comm.,
1982).

No exports of primates are allowed without the written permission of the Minister for the Environment and Natural Resources. A recent order bans the export of "monkeys and baboons" (Anon., 1982b), although exceptions are made for animals already held (C.R. Huxley, pers. comm., 1982).

Since at least the early 1960's, Kenya has been, and remains, one of the most important sources of African monkeys, especially anubis baboons, green monkeys and, to a lesser extent, yellow baboons (C. Boydell, pers. comm., 1980; J.G. Else, pers. comm., 1980; Kavanagh, this volume; Mack & Eudey, this volume). It is unlikely that there are any illegal exports of primates (C.E. Norris, pers. comm., 1981). Where primates (especially baboons) are agricultural pests, they are shot (J.G. Else, pers. comm., 1982).

Lesotho:

Papio ursinus.
(P. Steele, pers. comm., 1982).

Primates are not exported from Lesotho (P. Steele, pers. comm., 1982).

+ Liberia:
Cercocebus torquatus.
Cercopithecus aethiops,
C. campbelli, C. diana,
C. mona, C. nictitans,
C. petaurista.
Colobus badius, C. polykomos,
C. verus.
Galago demidovii, G. senegalensis.
Pan troglodytes.
Perodicticus potto.
(Dorst & Dandelot, 1972;
Jeffrey, 1977; P.D. Jenkins,
pers. comm., 1982).

Primate exports are illegal (O. Simpson-Titus, pers. comm., 1978).

Prior to the mid-1970's, Liberia was a major supplier of chimpanzees, but since then exports have ceased apart from the possibility that live chimpanzees are smuggled out via Sierra Leone (Jeffrey, 1977; Teleki & Baldwin, 1979). Black-and-white colobus and red colobus monkey skins were on sale in Monrovia in the mid-1970's (Jeffrey, 1977), but the main use of primates is currently for their meat. The high level of demand has undoubtedly depleted primate numbers within Liberia and led to large-scale hunting teams of Liberians in Sierra Leone. Most of the meat is smoked and taken to the Liberian market (Oates, 1980; pers. comm., 1980).

Libya: No wild or feral primates.

There are no laws concerning protection of wildlife (WTMU files, 1974).

No known trade.

+Madagascar:
Allocebus trichotis,*
Cheirogaleus major, C. medius*.*
*Daubentonia madagascariensis**
Hapalemur griseus, H. simus*.*
Indri indri.*
Lemur fulvus, L. catta,*
L. coronatus, L. macaco*,*
L. mongoz, L. rubriventer.*
Lepilemur dorsalis, L. edwardsi*,*
L. leucopus, L. microdon*,*
L. mustelinus, L. ruficaudatus*,*
L. septentrionalis.*
Lichanotus (=Avahi) laniger.*
*Microcebus coquereli**[3],
M. murinus, M. rufus*.*
Phaner furcifer.*
Propithecus diadema,*
P. verreauxi.*
Varecia variegata.*
(Petter, *et al.*, 1977;
Tattersall, 1982).

The trade and export of all primates has been illegal since 1927 except insofar as occasional permits may be granted for special purposes (A. Jolly, pers. comm., 1979).

With the exception of one or two individuals, presumably special cases allowed by the government, there are no primate exports from Madagascar (A. Jolly, pers. comm., 1979; Mack & Eudey, this volume).

+ Malawi:
Cercopithecus aethiops, C. mitis.
Galago crassicaudatus,
G. demidovii, G. senegalensis.
Papio cynocephalus, P. ursinus.

No known trade.

Mali:
Cercopithecus aethiops.
Erythrocebus patas.
Galago demidovii, G. senegalensis.
Pan troglodytes.
Papio anubis, P. papio.
(Dorst & Dandelot, 1972).

No known trade.

Mauritania:
Cercopithecus aethiops.
Erythrocebus patas.
Papio papio.
(Dorst & Dandelot, 1972).

No known trade.

+ Mauritius: *Macaca fascicularis* (introduced).

Permits are necessary for primate exports. They may be obtained from the Ministry of Agriculture, Natural Resources and the Environment, and from the Ministry of Commerce and Industry (A.W. Owadally, pers. comm., 1980).

In recent years, Mauritius has exported a few long-tailed macaques to the U.K., but it is not a major exporting country (R.E. Hackett, pers. comm., 1980).

+ Morocco: *Macaca sylvanus*

No known trade, except an unconfirmed field report of Barbary macaques being trapped in northern Morocco for export to Spain for biomedical research (J.E. Fa, pers. comm., 1982). However, monkeys are sold as pets in the bazaars, even though this practice is illegal (D.M. Taub, pers. comm., 1982).

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[3] *Microcebus coquereli* is placed in its own genus, *Mirza*, by some authorities, (e.g., Tattersall, 1982).

+ **Mozambique:**
Cercopithecus aethiops, C. mitis.
Galago crassicaudatus,
G. senegalensis.
P. cynocephalus, P. ursinus.

No known trade.

Namibia:
Cercopithecus aethiops.
Galago senegalensis.
Papio ursinus.
(Dorst & Dandelot, 1972;
P.D. Jenkins, pers. comm.,
1982).

There is almost no trade in primates, although in 1982, 15 baboons were donated to the Tygerberg Hospital in Cape Town, South Africa for research purposes. Since 1979, six squirrel monkeys of Australian origin have been imported via South Africa. A Namibian court ruled that these monkeys were domestic animals. Some green monkeys are probably taken to South Africa as pets by returning soldiers, and baboons are shot both for trophies and as agricultural pests (Namibian Department of Agriculture and Nature Conservation information, 1982).

+ **Niger:**
Cercopithecus aethiops.
Erythrocebus patas.
Galago senegalensis.
Papio anubis.
(Dorst & Dandelot, 1972).

No known trade.

+ **Nigeria:**
Arctocebus calabarensis.
Cercocebus torquatus.
Cercopithecus aethiops,
C. erythrogaster, C. erythrotis,*
C. mona, C. nictitans,
C. pogonias.
Colobus badius, C. guereza,
C. polykomos.
Erythrocebus patas.
Galago alleni, G. demidovii,
G. senegalensis.
Pan troglodytes.
Papio anubis.
Perodicticus potto.
(Dorst & Dandelot, 1972;
P.D. Jenkins, pers. comm.,
1982; IUCN, in prep.).

Great apes are fully protected under the Wild Animal Law 1965 and may be hunted or exported only for scientific purposes and with the permission of the minister responsible for wildlife preservation. All other primates may be hunted or exported only with a permit from the Chief Game Warden (WTMU files, 1965). However, Nigeria appears to lack the appropriate legislation for the implementation of CITES, so parties to the Convention are unable to import primates legally from Nigeria (Anon., 1980b).

Nigeria regularly exports small numbers of patas monkeys to the U.S.A. (Mack & Eudey, this volume). The city of Kano appears to be an outlet from Nigeria for considerable numbers of primates (J.F. Oates, pers. comm., 1982).

+ **Rwanda:**
Cercocebus albigena.
Cercopithecus aethiops,
C. ascanius, C. denti,
C. l'hoesti, C. mitis.
Colobus angolensis.
Galago demidovii.
Gorilla gorilla.
Pan troglodytes.
Papio anubis.
Perodicticus potto.
(C. & R.J. Aveling, pers.
comm., 1982; T.T. Struhsaker,
pers. comm., 1982).

Primate exports are banned unless a license is obtained from the National Parks Department. To date, no such licenses have been issued (confidential source, 1982).

The personnel of the Mountain Gorilla Project assist the National Parks Department in protecting primates, but Rwanda is probably a conduit for Zairean chimpanzees that are being illegally smuggled to Belgium (confidential source, 1982). Chimpanzees offered for sale within the country have been confiscated (J.P. Van der Becke, pers. comm., 1982) and at least five gorillas have been poached for commercial gain since 1978 (confidential source, 1982; Jackman, 1982). Golden guenon (*C. mitis kandti*) skins are openly seen for sale to tourists in the town of Gisenyi, although some may be brought in from Zaire (confidential source, 1982). Colobus skins were [illegible] seen in Gisenyi (confidential source, 1982).

+ **St. Helena (U.K.):** No wild or feral primates.

The U.S.A. imported twenty primates from St. Helena during 1980 (Mack & Eudey, this volume).

+ **Senegal:**
Cercopithecus aethiops,
C. campbelli, (C. nictitans?),
(C. petaurista?).
Colobus badius, C. polykomos.
Erythrocebus patas.
Galago demidovii, G. senegalensis.
Pan troglodytes.
Papio papio.
(Dorst & Dandelot, 1972;

P.D. Jenkins, pers.
comm., 1982).

All primates other than chimpanzees may be trapped and exported for commercial and scientific purposes with a permit from the Water and Forest Service (E.H. Sene, pers. comm., 1981).

Senegal is a regular, but not a major, exporter of live primates (Kavanagh, this volume; Mack & Eudey, this volume; P. Steele, pers. comm., 1982).

Sierra Leone: *Cercocebus torquatus.*
Cercopithecus aethiops,
C. campbelli, C. diana,
C. petaurista.
Colobus badius, C. polykomos,
C. verus.
Erythrocebus patas.
Galago demidovii. G. senegalensis.
Pan troglodytes.
Papio papio.
Perodicticus potto.
(Oates, 1980; Robinson, 1971).

Since January, 1982, the export of all wildlife and all wildlife products has been banned (G. Teleki, pers. comm., 1982). Chimpanzee exports are banned under a Presidential Decree of September, 1978, although this ban may be lifted for limited periods (Teleki & Baldwin, 1979; confidential source, 1979; J.F. Oates, pers. comm., 1980).

Sierra Leone has been a regular supplier of live primates for export for many years (Mack & Eudey, this volume), including large numbers of chimpanzees (Teleki & Baldwin, 1979). In addition, monkey meat is currently exported to Liberia on a very large scale (J.F. Oates, pers. comm., 1980), and considerable numbers of monkeys were systematically killed for meat and as crop pests in "monkey drives" in the 1940's and 1950's (MacKenzie, 1952; J.F. Oates, pers. comm., 1980).

Somalia: *Cercopithecus aethiops, C. mitis.*
Galago crassicaudatus,
G. senegalensis.
Papio cynocephalus,
P. hamadryas.
(Dorst & Dandelot, 1972).

The protection (or otherwise) of primates is regulated under Vermin Schedule 10 of Somalia Wildlife Law, No. 15, 1969, and under Law No. 65, 1971. Blue monkeys are totally protected. Baboons and green monkeys may be trapped and exported under a quota system, although permits are required from the National Range Agency (National Range Agency information, TRAFFIC—U.S.A. files; A. Eudey, pers. comm., 1982).

Somalia has been a major source of green monkeys for the U.S.A. since at least 1964 (Mack & Eudey, this volume). Savannah baboons and green monkeys are regularly hunted as agricultural pests (P. Messeri, pers. comm., 1982).

+ **South Africa:** *Cercopithecus aethiops, C. mitis.*
Galago crassicaudatus,
G. senegalensis.
Papio ursinus.

The import and export trade is controlled by the provincial administrations and primate imports are banned in all of the provinces (Anon., 1981a). All commercial primate exports from the Transvaal are banned (Transvaal Provincial Administration, Nature Conservation Division, 1980). Primates may be exported from the other provinces for scientific purposes with a permit from the relevant provincial authority (Cape Province Department of Nature and Environmental Conservation, 1980; Natal Parks, Game and Fish Preservation Board, 1980; Orange Free State Nature Conservation Office, 1981).

A confidential source reports regular imports of squirrel monkeys that arrive at Cape Town airport where they are given a landing permit by the Veterinary Department before being sent to Johannesburg. At least 1,500 monkeys were imported in this way between June 1980 and February 1981 (confidential source, 1982). About 300 baboons are used annually for medical research at the University of Witwatersrand (C. Bielert, pers. comm., 1980). There is no evidence of a regular export trade, but 25 baboons were sent to the U.S.A. for research purposes in 1980 (South African CITES report).

+ **Sudan:** *Cercopithecus aethiops, C. mitis.*
Colobus guereza.
Erythrocebus patas.
Galago senegalensis.
Pan troglodytes.
Papio anubis, P. hamadryas.
(Dorst & Dandelot, 1972).

A license from the Game Department is required for all primate exports (M. Hall, pers. comm., 1981).

No known trade.

Swaziland: *Cercopithecus aethiops.*
Galago crassicaudatus.
Papio ursinus.
(Dorst & Dandelot, 1972).

No known trade.

+ **Tanzania:** *Cercocebus galeritus.*
Cercopithecus aethiops,
C. ascanius, C. mitis.
Colobus angolensis, C. badius,
C. guereza, C. pennanti.

Erythrocebus patas.
Galago crassicaudatus,
  G. demidovii,
  G. senegalensis.
Pan troglodytes.
Papio anubis, P. cynocephalus.
(W.A. Rodgers, pers. comm.,
  1982; T.T. Struhsaker, pers.
  comm. 1982).

Under the Wildlife Conservation Act 1974 and subsidiary legislation, chimpanzees and red colobus monkeys are protected and may only be exported with a permit signed by both the Director and Chief Research Officer of the Game Division. Other primates may be trapped and exported with a permit from the Director of the Game Division (Game Division information, 1982).

Tanzania was a major exporter of primates to the U.S.A. until the early 1970's, but since then the trade appears to have ceased (Mack & Eudey, this volume). There are regular baboon pest extermination programs (W.A. Rodgers, pers. comm., 1982).

+ Togo:
Cercopithecus aethiops, C. mona,
  C. petaurista.
Colobus polykomos, C. verus.
Erythrocebus patas.
Galago demidovii, G. senegalensis.
Papio anubis.
Perodicticus potto.

Togo has exported a few primates over the period for which records are available (since 1964), but the numbers involved are relatively small (Kavanagh, this volume; Mack & Eudey, this volume).

Uganda:
Cercocebus albigena.
Cercopithecus aethiops,
  C. ascanius, C. denti,
  C. l'hoesti,
  C. mitis, C. mona, C. neglectus.
(Colobus angolensis?), C. badius,
  C. guereza.
Erythrocebus patas.
Galago crassicaudatus,
  G. demidovii, G. inustus,
  G. senegalensis.
Gorilla gorilla.
Pan troglodytes.
Papio anubis.
Perodicticus potto.
(T.T. Struhsaker, pers. comm.,
  1982).

Great apes and colobus monkeys are totally protected. Permits from the Chief Game Warden are required for the trapping and export of all other primate species (J.M. Okua, pers. comm., 1982).

Primates used to be killed and traded on a large scale. For example, in 1964, 3,319 green monkeys, patas, baboons and other monkeys were killed as "vermin" and 4,000 monkeys (mostly greens) were exported for laboratory use (Jolly, 1966). Today, there are regular but very few primate exports (Kavanagh, this volume). Although there is no local breeding for export, "harvesting on a sustained basis is planned in gazetted conservation areas for those species which are not scheduled in (the) Game Act" (J.M. Okua, pers. comm., 1982). A recent offer of chimpanzees and gorillas for export (Kyeyune, 1980) was later withdrawn, although patas monkeys may be exported in the near future (Anon., 1980c). Black-and-white colobus monkeys are killed for their skins, which are used for traditional dance costumes (J.M. Okua, pers. comm., 1982).

Upper Volta:
Cercopithecus aethiops
Erythrocebus patas.
Galago demidovii, G. senegalensis.
Papio anubis.
(B. Bosquet, pers. comm., 1982;
  P.D. Jenkins, pers. comm.,
  1982).

There are "no official primate exports" (B. Bousquet, pers. comm., 1982).

+ Zaire:
Allenopithecus nigroviridis.
Arctocebus calabarensis.
Cercocebus albigena, C. aterrimus,
  C. galeritus,
*C. cephus, C. denti, C. dryas**
  (known from single specimen),
  C. hamlyni, C. l'hoesti,
  C. mitis, C. neglectus,
  C. nictitans, C. pogonias,
  C. wolfi.*
Colobus angolensis, C. badius,
  C. guereza.
Erythrocebus patas.
Euoticus elegantulus.
Galago crassicaudatus,
  G. demidovii, G. inustus,
  G. senegalensis.
Gorilla gorilla.
Miopithecus talapoin.
Pan paniscus, P. troglodytes.*
Papio anubis, P. cynocephalus.
Perodicticus potto.

Great apes, colobus monkeys, galagos and blue monkeys (including the golden guenon, *C. mitis kandti*) are protected and may only be exported with the special authorization of the Minister of Agriculture. The export of other primates is not subject to any special authorization (WTMU files, undated).

Zaire is not a major exporter of live primates (Kavanagh, this volume), but it is certainly a current source of smuggled chimpanzees (confidential source, 1982; F. Herrejon, pers. comm., 1981) and possibly also gorillas (confidential source, 1982). Golden guenon skins are openly sold to tourists in the eastern town of Goma (confidential source, 1982).

+ **Zambia:**
Cercopithecus aethiops,
C. ascanius, *C. mitis*.
Colobus angolensis.
Galago crassicaudatus,
G. demidovii, *G. senegalensis*.
Papio cynocephalus, *P. ursinus*.
(Dorst & Dandelot, 1972;
P.D. Jenkins, pers. comm., 1982).

The export of any primate is illegal unless licensed by the Director of National Parks and Wildlife or by the Minister of Lands and National Resources (WTMU files, 1975).

No known trade.

+ **Zimbabwe:**
Cercopithecus aethiops, *C. mitis*.
Galago crassicaudatus,
G. senegalensis.
Papio ursinus.
(D.H.M. Cummings, pers. comm., 1982; E.M. Jones, pers. comm., 1982).

In September 1982, new regulations were introduced by the Department of National Parks and Wildlife Management. They are known as the Control of Goods (Import and Export) (Wildlife) Regulations of 1982 and provide for penalties of up to 5 years in jail and/or fines of up to Z$5,000 or the value of the goods involved. All primate exports are controlled under these regulations (Anon., 1982c).

No known trade, apart from four animals in 1980 (D.H.M. Cummings, pers. comm., 1982). All primates are regarded as problem animals with baboons and green monkeys being particularly looked upon as crop pests. Farmers are at liberty to destroy animals that threaten their crops or stock (E.M. Jones, pers. comm., 1982).

B. South and Central America and the Caribbean

+ **Argentina:**
Alouatta caraya.
Aotus azarae.
Cebus apella.
(E.O. Gonzalez Ruiz, pers. comm., 1981; Hershkovitz, 1983).

The export of all primates is illegal (E.O. Gonzalez Ruiz, pers. comm., 1981; O.J. Colillas, pers. comm., 1980) under Ley-Conservacion de la Fauna 22421, March 27, 1981 (Fuller & Swift, 1984).

The U.S.A. imported a large number of primates from Argentina in 1976 (Mack & Eudey, this volume) but there is no other evidence of involvement in the live primate trade. The U.K. exported 80 black-and-white colobus monkey skins to Argentina in 1979 (Kavanagh, this volume). O.J. Colillas (pers. comm., 1980) suggests that the regulation of primate capture within Argentina is so strict that it might be easier to import animals for internal research use than to trap them, although in fact a few may be trapped under license for scientific purposes (E.O. Gonzalez Ruiz, pers. comm., 1981).

Barbados: *Cercopithecus aethiops* (introduced)

There are no specific laws pertaining to the trapping or export of primates other than a government bounty of US$2.00 for each tail brought in. The Ministry of Agriculture, Food and Consumer Affairs gives permission for trapping and export (J. Baulu, pers. comm., 1981). Approximately 300 monkeys are trapped and exported annually, mainly to the U.S.A. for use in polio vaccine production and testing. The operation is conducted by the Caribbean Agricultural Research and Development Institute (J. Baulu, pers. comm., 1981).

Belize:
Alouatta villosa.
Ateles geoffroyi.
Cebus capucinus.
(Freese & Oppenheimer, 1981;
O. Rosado, pers. comm., 1982).

Belize was included in the British Instrument of Ratification of CITES as a dependent territory of the U.K. but since independence in September, 1981, it is no longer a party to the Convention. However, Belize continues to abide by CITES regulations under domestic legislation (Fuller & Swift, 1984).

The hunting, trapping and trading of primates is illegal (O. Rosado, pers. comm., 1982) under the Wildlife Protection Act of 1981. This ban ends all commercial dealing of wildlife for seven years, at which time the Minister responsible for wildlife protection shall recommend whether or not to lift or extend the trade ban (Fuller & Swift, 1984).

No known trade.

+ **Bolivia:**
Alouatta caraya, *A. seniculus*.
Aotus azarae, *A. nigriceps*.
Ateles paniscus.
Callicebus moloch.
Callimico goeldii.
Callithrix argentata.
Cebuella pygmea.
Cebus albifrons, *C. apella*.

(Lagothrix lagotricha?)
Pithecia hirsuta, P. monachus.
Saguinus fuscicollis, S. labiatus,
S. imperator.
Saimiri sciureus.
(Heltne, *et al.*, 1975; Freese *et al.*, 1982; Hershkovitz, 1983; G. Bejarano, pers. comm., 1982; A.G. Pook, pers. comm., 1980).

Under Act 12301 of March 14, 1975, primates may be captured on land set aside for agro-industries and colonization (O. Suarez Morales, pers. comm., 1982). The provisions of CITES are implemented under Act 16464 of May 17, 1979. The use of export certificates was introduced in mid-1981 and re-formulated to make control more efficient in August 1982 (G. Bejarano, pers. comm., 1982).

There is a massive export trade in primates, most of which go to Japan and the U.S.A. (Kavanagh, this volume; Mack & Eudey, this volume). Most of the trade is not officially authorized by Centro de Desarollo Forestal and is therefore not properly regulated (A.G. Pook, pers. comm., 1980; O. Suarez Morales, pers. comm., 1982; R.A. Mittermeier, pers. comm., 1980). Bolivia is undoubtedly an outlet for smuggled Brazilian monkeys (A.G. Pook, pers. comm., 1980; A. Rylands, pers. comm., 1980).

+ Brazil: *Alouatta belzebul**, *A. caraya, A. fusca**,
A. seniculus.
Aotus infulatus, A. nancymai, A. nigriceps
A. trivirgatus, A. vociferans.
Ateles belzebuth, A. paniscus.
*Brachyteles arachnoides**.
Cacajao calvus, C. melanocephalus.
*Callicebus moloch, C. personatus**,
C. torquatus.
Callimico goeldii.
*Callithrix argentata, C. aurita**,
*C. flaviceps**, *C. geoffroyi**,
*C. humeralifer**, *C. jacchus**,
*C. penicillata**.
Cebuella pygmea.
Cebus albifrons, C. apella, C. nigrivittatus.
*Chiropotes albinasus**, *C. satanas.*
Lagothrix lagotricha.
*Leontopithecus chrysomelas**,
*L. chrysopygus**, *L. rosalia**[4].
*Pithecia albicans**, *P. hirsuta,*
P. monachus, P. pithecia.
*Saguinus bicolor**, *S. fuscicollis,*
S. imperator, S. inustus, S. labiatus,
S. midas, S. mystax, S. nigricollis.
Saimiri sciureus.
(J.M. Ayres, pers. comm., 1982; R.A. Mittermeier, pers. comm., 1984; Hershkovitz, 1983).

Under the law number 5197, the export of any primate has been illegal since 1967 (Smith, 1978; Fuller and Swift, 1984).

There have been few recorded imports of primates from Brazil to other countries since 1974 (Kavanagh, this volume; Mack & Eudey, this volume), although five *L. rosalia* were imported into the U.S.A. in 1980 with Brazilian permits (Mack & Eudey, this volume) and some animals are smuggled out through Bolivia (A.G. Pook, pers. comm., 1980; A. Rylands, pers. comm., 1980) and Paraguay (Kavanagh, this volume), and others were smuggled out through Colombia at least until the early 1970's (J.M. Ayres, pers. comm., 1980; R.A. Mittermeier, pers. comm., 1980). The most important trade in Brazil is internal, involving live animals for biomedical purposes and pets. Hunting of primates for food is also a major factor in some areas such as Amazonia (Mittermeier & Coimbra-Filho, 1977; Rylands & Mittermeier, 1983). Capture and hunting of primates is illegal, widespread and unregulated, and total volumes are not available (J.M. Ayres, pers. comm., 1982; R.A. Mittermeier, pers. comm., 1980).

+ Chile: No wild or feral primates.

The only known trade into or out of Chile consists of occasional imports for zoos and the possibility of a few more for pets (I. Castro Poblete, pers. comm., 1982).

+ Colombia: *Alouatta palliata, A. seniculus.*
*Aotus brumbacki**, *A. lemurinus,*
A. trivirgatus, A. vociferans.
Ateles belzebuth, A. fusciceps,
A. geoffroyi.
(Cacajao calvus?), C. melanocephalus.
Callicebus moloch, C. torquatus.
Callimico goeldii.
Cebuella pygmaea.
Cebus albifrons, C. apella, C. capucinus.
Lagothrix lagotricha.
Pithecia hirsuta, P. monachus.
Saguinus fuscicollis, S. inustus,
*(S. labiatus?), S. leucopus**,
*S. nigricollis, S. oedipus**.
Saimiri sciureus.
(Hernandez-Camacho & Cooper, 1976; Hershkovitz, 1983; J.M. Ayres, pers. comm., 1982).

Under the Natural Resources Code of 1974 and INDERENA Resolution 0392, the capture and export of primates is banned, although exceptions to the ban are possible insofar as licenses for export for scientific research may be granted if the foreign laboratory concerned issues a certificate of need "duly validated before Colombian Consuls." No such licenses have been issued since 1974 (Donadio, 1981; J. Hernandez-Camacho, pers. comm., 1980). See Cooper & Hernandez-Camacho (1975) for relevant legal history.

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[4] Hershkovitz (1977) considers the three *Leontopithecus* to be subspecies of *L. rosalia*. However, the most recent study of these animals (Rosenberger & Coimbra-Filho, 1984) indicates that they should be considered distinct species, and this decision is followed here.

Colombia was a major supplier of primates until 1974 but there have been few recorded exports since then (Kavanagh, this volume; Mack & Eudey, this volume). Panama has been a regular outlet for smuggled Colombian primates since the Colombian export ban came into operation (J. Hernandez-Camacho, pers. comm., 1980); these include cotton-top tamarins (*Saguinus oedipus*) which have been totally protected in Colombia since 1970 (A. Donadio, pers. comm., 1977). Colombia used to be an illegal outlet for Brazilian primates via Leticia and the upper Japura River (J.M. Ayres, pers. comm., 1980) but this may have ceased since the Colombian export ban of 1974. The larger monkeys, including woolly monkeys and spider monkeys, are hunted (Kavanagh, pers. obs., 1973) and used as bait in big cat traps (Smith, 1976). Many primates species also are hunted for food in certain areas of the country (Mittermeier, pers. comm., 1983).

+ Costa Rica:

Alouatta palliata.
Ateles geoffroyi.
Cebus capucinus.
Saguinus oedipus.[5]
Saimiri oerstedi.
(G.A. Flores Gamboa, pers. comm., 1982; E. Lopez Pizarro, pers. comm., 1982; P.D. Jenkins, pers.comm., 1982).

Act 45-51 (Conservation of Wild Fauna 1970) prohibits the export of primates (G.A. Flores Gamboa, pers. comm., 1982). All monkeys in Costa Rica are listed on its protected species lists and prohibited from hunting under Decree No. 9467 of January 1979 (Fuller & Swift, 1984). At present, the government is not issuing export permits for wildlife listed on any of the CITES Appendices, even for scientific purposes (Fuller & Swift, 1984).

Some primates were exported between 1970 and 1978, but these probably totalled fewer than fifty. Most went to the U.S.A. or Japan (Smith, 1978; Kavanagh, this volume).

Cuba: No wild or feral primates.

A few imports have recently occurred (Kavanagh, this volume).

+ Ecuador:

Alouatta palliata, A. seniculus.
Aotus vociferans.
Ateles belzebuth, A. fusciceps.
Callicebus moloch, (C. torquatus?).
Cebuella pygmaea.
Cebus albifrons, C. apella.
Lagothrix lagotricha.
Pithecia hirsuta, P. monachus.
Saguinus fuscicollis, S. nigricollis.
Saimiri sciureus.
(Freese & Oppenheimer, 1981; Hershkovitz, 1983).

In 1969, Ecuador implemented a five year ban on exportation of all wildlife under Decree No. 170-CPL (Fuller & Swift, 1984). Executive Decree No. 487, published in the Official Register of 18th August, 1980, bans all commercial exports of primates (Anon. 1981b; Fuller & Swift, 1984).

Ecuador was a minor supplier of primates to the U.S.A. between 1964 and 1975 but does not appear to have exported any monkeys since then (Mack & Eudey, this volume).

El Salvador:

Alouatta palliata.
Ateles geoffroyi.

At present there is no legislation protecting wildlife in El Salvador, although a fairly comprehensive law has been proposed (Fuller & Swift, 1984).

The U.S.A. imported 11 night monkeys (*Aotus* spp.) from El Salvador in 1976 (Mack & Eudey, this volume) and Nicaragua exported a few monkeys to El Salvador in 1976 and 1979 (S. Estrada, pers. comm., 1981).

+ French Guiana: (France)

Alouatta seniculus.
Ateles paniscus.
Cebus apella, C. nigrivittatus.
Chiropotes satanas.
Pithecia pithecia.
Saguinus midas.
Saimiri sciureus.

French Guiana is a department of the French Republic and therefore included in the French membership of CITES.

No known trade apart from a few monkeys to the U.S.A. in 1981 (Mack, 1982). Given that there is a demand for primates in Metropolitan France, it seems hard to believe that none are sent there. Small numbers of stuffed primates are sold in the local markets (Mittermeier, pers. comm., 1983). Monkeys appear regularly in the Cayenne meat market and monkey meat is still available in some restaurants.

+ Guadeloupe/ Martinique (France): No feral primates (?)

Guadeloupe/Martinique are departments of the French Republic and therefore included in the French membership of CITES.

The U.S.A. recorded the importation of 26 primates from the "French West Indies" during 1981 (Mack, 1982).

Grenada: *Cercopithecus mona* (introduced)
(Napier & Napier, 1967).

No known trade.

+ **Guatemala:** *Alouatta palliata., A. villosa.*
Ateles geoffroyi.
(Freese & Oppenheimer, 1981).

Primates may only be exported with the permission of the National Forest Institute (J.C. Cardona Paiz, pers. comm., 1982).

There is no legal export trade and inquiries made of persons involved in trading in other wildlife did not reveal any evidence of an illegal trade (J.C. Cardona Paiz, pers. comm., 1982). Nicaragua exported a few primates to Guatemala in 1979 (S. Estrada, pers. comm., 1981).

+ **Guyana:** *Alouatta seniculus.*
Ateles paniscus.
Cebus apella, C. nigrivittatus.
Chiropotes satanas.
Pithecia pithecia.
Saguinus midas.
Saimiri scirueus.
(Muckenhirn *et al.*, 1975:
P.D. Jenkins, pers. comm., 1982; R. Mittermeier, pers. comm., 1983).

In 1976, a total ban was placed on all wildlife exports pending a report of the Committee for the Conservation and Protection of Wildlife and the expected revision of wildlife laws (Anon., 1976a; 1976b). Since then, wildlife protection has been enacted through informal administrative decision making by the Ministry of Agriculture (Fuller & Swift, 1984). Export of primates (primarily capuchins and squirrel monkeys) is limited to an annual quota of approximately 1,000. Primates are not covered, however, by any specific legislation or regulation (Fuller & Swift, 1984).

Guyana has been a regular exporter of primates for at least the last ten years (Kavanagh, this volume; Mack & Eudey, this volume). Imports to the U.S.A. include uakaris and species of sakis and capuchins that are not known to occur in Guyana (Mack & Eudey, this volume; Muckenhirn *et al.*, 1975).

Haiti: No feral primates (?).

The U.S.A. recorded the importation of six primates from Haiti during 1981 (Mack, 1982).

Honduras: *Alouatta palliata.*
Ateles geoffroyi.
Cebus capucinus.

Honduras lacks comprehensive legislation regulating hunting or commercial trade in most wildlife including primates (Fuller & Swift, 1984).

The U.S.A. imported a small number of monkeys from Honduras during the 1970's, including tamarins and species of spider monkeys and capuchins that do not occur in Honduras (Mack & Eudey, this volume).

+ **Montserrat (U.K.):** No wild or feral primates.

Montserrat is included in the British Instrument of Ratification of CITES as a U.K. dependent territory.

The U.S.A. imported 100 primates from Montserrat in 1977 (Mack & Eudey, this volume).

Mexico: *Alouatta palliata, A. villosa.*
Ateles geoffroyi.
(J.J.A. Reyes Rodriguez, pers. comm., 1982; R.A. Mittermeier, pers. comm., 1984).

The hunting, capture and export of wild animals is illegal without a license (WTMU files, 1975).

There are no exports of primates on record, but Mexico regularly imports small numbers of various species (J.J.A. Reyes Rodriguez, pers. comm., 1982), and two pygmy chimpanzees were smuggled into Mexico from Zaire in 1981 (F. Herrejon, pers. comm., 1981). There is some internal research use of imported macaques (Estrada & Estrada, 1981).

Netherland Antilles: No wild or feral primates (?).

The U.S.A. recorded the importation of 63 primates from the Netherland Antilles during 1981 (Mack, 1982).

+ **Nicaragua:** *Alouatta palliata.*
Ateles geoffroyi.
Cebus capucinus.
(S. Estrada, pers. comm., 1981).

Decree number 625 of March 1977 prohibits the commercial exploitation of all mammals (S. Estrada, pers. comm., 1981; Fuller & Swift, 1984).

Several hundred monkeys were exported between 1968 and 1979, and in addition, a few were imported (Kavanagh, this volume; Mack & Eudey, this volume).

+ **Panama:** *Alouatta palliata.*
Aotus lemurinus.
Ateles fusciceps, A. geoffroyi
Cebus capucinus.

Saguinus oedipus[5].
Saimiri oerstedi.

Under the Directive (RENARE Directive 002-80) laid down on 24 January, 1980, all primates are fully protected from hunting and any trade (Anon., 1982d).

Panama was a regular exporter of primates throughout the 1970's and a major supplier to the U.S.A. between 1974 and 1978 (Kavanagh, this volume; Mack & Eudey, this volume). The exports included species that do not occur in Panama, most notably cotton-top tamarins (*Saguinus oedipus*) from Colombia, of which at least 679 were sent to the U.S.A. between 1974 and 1976 (J. Walsh, pers. comm., 1976). The primate export trade seems to have been greatly reduced after 1979 (Kavanagh, this volume; Mack & Eudey, this volume).

+ **Paraguay:**
Alouatta caraya.
Aotus azarae.
Callicebus moloch.
Callithrix argentata.
Cebus apella.
(Stallings & Mittermeier, 1983).

Under the Ministry of Agriculture and Livestock Decree No. 18,796 (1975), the hunting, commerce, importation and exportation of wildlife is prohibited (Fuller & Swift, 1984). However, official CITES permits were issued for the export of primates until November 1981, when the government suspended their issuance (TRAFFIC—U.S.A. files).

Paraguay has been since the 1960's, and remained until 1981, a small but regular world source of South American primates, including one or two species (e.g., *Callithrix jacchus*) that do not occur in the country (Kavanagh, this volume; Mack & Eudey, this volume).

+ **Peru:**
Alouatta seniculus.
Aotus azarae, *A. miconax**, *A. nancymai*, *A. nigriceps*, *A. vociferans*.
Ateles belzebuth, *A. paniscus*.
Cacajao calvus.
Callicebus moloch, *C. torquatus*.
Callimico goeldii.
Cebuella pygmea.
Cebus albifrons, *C. apella*.
*Lagothrix flavicauda**, *L. lagotricha*.
Pithecia hirsuta, *P. monachus*.
Saguinus fuscicollis, *S. imperator*. *S. labiatus*, *S. mystax*, *S. nigricollis*.
Saimiri sciureus.
(P. Soini, pers. comm., 1980; Hernandez-Camacho & Cooper, 1976; Hershkovitz, 1983).

Under Decreto Supreme No. 934-73-AG, all hunting, capture of and trading in primates from the La Selva region (the Amazonian lowlands east of the Andes), has been illegal since 1973 except for scientific purposes (Anon., 1974; A. Brack Egg, pers. comm., 1980; Smith, 1978; Fuller & Swift, 1984).

Peru was the biggest supplier of South American primates prior to its export ban in 1973 (Mack & Eudey, this volume; Markfield, 1972; Smith, 1978). Hundreds of thousands of animals were exported in the 1960's, mainly to the U.S.A., and many went to the pet trade (Smith, 1978). Since 1976, all legal exports have been carried out under the auspices of the Pan American Health Organization and have been to the U.S.A. (Mack & Eudey, this volume, A. Brack Egg, pers. comm., 1980; M. Moro, pers. comm., 1982; P. Soini, pers. comm., 1980), and a very small number of these animals have subsequently been re-exported to Japan, West Germany and the U.S.S.R. (Kavanagh, this volume; Mack & Eudey, this volume).

+ **Puerto Rico: (U.S.A.)**
Various Old and New World species, including *Macaca mulatta* and *Saimiri sciureus*, have escaped from research institutions and may be established on mainland Puerto Rico (J.C. Algarin, pers. comm., 1982).

Regulations relating to primates are enforced by the U.S. Department of Agriculture (J.C. Algarin, pers. comm., 1982).

There are several primate research institutions and breeding colonies in Puerto Rico (Eudey & Mack, this volume).

St. Kitts-Nevis-Anguilla:
Cercopithecus aethiops (introduced) (Napier & Napier, 1967; F.E. Poirier, pers. comm., 1983).

The U.S.A. has imported small numbers of primates from St. Kitts since 1977 (Mack & Eudey, this volume).

+ **Suriname:**
Alouatta seniculus.
Ateles paniscus.
Cebus apella, *C. nigrivittatus*.
Chiropotes satanas.
Pithecia pithecia.
Saguinus midas.
Saimiri sciureus.
(Mittermeier & van Roosmalen, 1981; Suriname Forest Service Information, 1982).

Under the Game Law of 1954 and the 1970 Game Resolution, all primate species except *Cebus apella* are fully protected and cannot be hunted, captured or traded. *C. apella* is protected as a game species. The Game Law is administered by the Suriname Forest Service (Fuller & Swift, 1984).

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[5] The Panamanian tamarin species, listed as *Saguinus oedipus geoffroyi* in CITES, is considered a distinct species by some authorities (e.g., Mittermeier & Coimbra-Filho, 1981).

There are no live exports but a very few dead specimens were exported in 1978 and 1981 for scientific purposes. In addition, there is a small local pet trade (Suriname Forest Service information, 1982).

+ Trinidad and Tobago:
Alouatta seniculus.
Cebus albifrons (introduced?)
(B. Ramdial, pers. comm., 1982; R.A. Mittermeier, pers. comm., 1983).

Under the Conservation of Wildlife Act 1981, both primate species are fully protected and all exports are illegal (B. Ramdial, pers. comm., 1982).

The U.S.A. has recorded a total of ten primate imports from Trinidad since 1964 (Mack & Eudey, this volume). Some monkeys are kept locally as pets (B. Ramdial, pers. comm., 1982).

+ Uruguay: No wild or feral primates.

The U.S.A. has recorded the importation of a few primates from Uruguay between 1968 and 1977 (Mack & Eudey, this volume). Presumably, these were illegal transhipments from other countries. It is likely that some came from Argentina (O.J. Collilas, pers. comm., 1980).

+ Venezuela:
Alouatta seniculus.
Aotus lemurinus, A. trivirgatus.
Ateles belzebuth.
Cacajao melanocephalus.
Callicebus torquatus.
Cebus albifrons, C. apella, C. nigrivittatus.
Chiropotes satanas.
Lagothrix lagotricha.
Pithecia pithecia.
Saimiri sciureus.
(J.M. Ayres, pers. comm., 1982; P.D. Jenkins, pers. comm., 1982; Hershkovitz, 1983).

Primate exports have been illegal since August 1970 under Ley de Proteccion a la Fauna Silvestre (T. Blohm, pers. comm., 1980; Fuller & Swift, 1984). To import primates the following documents are needed: a certificate of origin, an export permit and a health certificate (L.F. Guerrero, pers. comm., 1982).

There are no records of exports, but Venezuela imported four chimpanzees from the U.S.A. for zoo display in 1979 (Kavanagh, this volume).

C. Asia

Afghanistan:
Macaca mulatta
(Napier & Napier, 1967).

Although some rhesus monkeys were exported from Paktya Province in the late 1970's, prior to the coup, the numbers involved were probably very small. There is currently no evidence of exports nor of any local consumption for food or any other purpose (B.M. Marriott, pers. comm., 1980).

+ Bangladesh:
Hylobates hoolock.
Macaca assamensis, M. fascicularis, M. mulatta, M. nemestrina.
Nycticebus coucang.
Presbytis entellus, P. phayrei, P. pileata.
(Gittins & Akonda, 1982; Khan & Ahsan, 1981).

The Bangladesh Wildlife (Preservation) Order 1973 bans the capture, possession and trade of all primates. However, the government occasionally relaxes the ban to allow the export of rhesus monkeys (M.A. Reza Khan, pers. comm., 1980).

Bangladesh was a major exporter of rhesus monkeys during the period 1972 to 1979 (Mack & Eudey, this volume) and may have been a smuggling outlet for Indian rhesus following India's 1978 export ban (R. Ali, pers. comm., 1981). A controversial contract between the government of Bangladesh and MOL Enterprises, an American company, for the regular export of rhesus monkeys to the U.S.A. was terminated in 1979 (Mack & Eudey, this volume). There have been few exports since 1979 (Kavanagh, this volume).

Bhutan:
Macaca assamensis, M. mulatta.
Presbytis entellus, P. geei.

All trading of primates is totally prohibited (Bhutan Director of Forests, pers. comm., 1982).

No known trade.

Brunei:
Hylobates muelleri.
Macaca fascicularis, M. nemestrina.
Nasalis larvatus.
Nycticebus coucang.
(Pongo pygmaeus?)
Presbytis cristata, P. hosei, P. rubicunda.
Tarsius bancanus.
(Medway, 1977; Brunei Museum Information, 1981).

The Wildlife Protection Enactment of 1978 prohibits the hunting, killing and capture of scheduled protected species. No person may sell, offer for sale or have in his possession any protected animal or trophy or flesh thereof, except under license. The export of protected species is also prohibited except under license. Penalties include imprisonment and heavy fines. The slow loris, the proboscis monkey and the orang-utan are protected animals, and in addition, the export of "apes and monkeys" is forbidden under license (Anon., 1982e).

No known trade.

Burma:
Hylobates hoolock, H. lar.
Macaca arctoides, M. assamensis,
M. fascicularis, M. mulatta,
M. nemestrina.
Nycticebus coucang.
Presbytis cristata, P. obscura,
P. phayrei, P. pileata.

Under Section 11 of the Burmese Wildlife Protection Act 1936, the export of all live animals is illegal without a license. Licenses are only issued in cases of animal exchange between foreign and Burmese zoos (J.L. Anderson, pers. comm., 1980).

Japan imported 34 primates from Burma in 1980 (Y. Kawanishi, pers. comm., 1981), and the U.S. imported 50 rhesus monkeys from Burma in 1982 (D. Mack, pers. comm., 1983). Other than these transactions, there is no evidence of any trade.

+ **China:**
Hylobates concolor, H. hoolock,
H. lar.
Macaca arctoides, M. assamensis,
M. mulatta, H. nemestrina,
M. thibetana.
Nycticebus coucang.
Presbytis entellus, P. francoisi,
P. phayrei.
Pygathrix nemaeus.
Rhinopithecus brelichi,*
R. roxellanae.*

The export of all wild-caught primates is banned, although captive-bred primates may be exported (Kunlong Ben, pers. comm., 1982).

China is a minor exporter of primates to Japan and the U.S.A. (Y. Kawanishi, pers. comm., 1981; Mack and Eudey, this volume). A few years ago, rhesus that were offered to the U.K. were considered too expensive to be purchased by the major British importer (R.E. Hackett, pers. comm., 1980).

Dubai: No wild or feral primates.

Pakistan exported five unidentified primates to Dubai in the period 1968-1969, and Uganda exported one green monkey to Dubai in 1982 (Kavanagh, this volume), but no other trade is known.

+ **Hong Kong:**
Macaca fascicularis (introduced),
M. fuscata (introduced),
M. mulatta.
(C.H. Southwick, pers. comm., 1982).

Macaque species are totally protected under the Wild Animals Protection Ordinance. In addition, the import, export and possession of any primate has been prohibited, except under license, since June 1978, under the Animals and Plants (Protection of Endangered Species) Ordinance, Chapter 187, 1976. Licenses may be issued by the CITES management authority (the Department of Agriculture and Fisheries) in accordance with the provisions of CITES. Prior to 1978, not all primates were listed under this law, since the listing followed the CITES appendices. Penalties include fines, imprisonment and the mandatory confiscation of seized specimens. Primate imports are also controlled under veterinary legislation (C. Huxley, pers. comm., 1982).

In the early 1960's, Hong Kong was a center for the smuggling of protected species, including orang-utans. Since then, there has been a small but regular, legitimate import and export trade (Kavanagh, this volume; Mack & Eudey, this volume). Government figures list 50 live primates imported in 1979, 23 in 1980, and 7 in 1981 (T. Sharr, pers. comm., 1982). A very few monkeys are used in Hong Kong for tissue culture and endocrinological work.

+ **India:**
Hylobates hoolock.
Loris tardigradus.
Macaca arctoides, M. assamensis,
M. fascicularis, M. mulatta,
M. nemestrina, M. radiata,*
M. silenus.*
Nycticebus coucang.
Presbytis entellus, P. geei,
P. johnii, P. pileata.*
(Groves, 1970; A. Kumar, pers. comm., 1982).

The Wild Life (Protection) Act 1972 specifically protects lion-tailed macaques from hunting, capture and export (TRAFFIC-U.S.A. files). Since March 1978, the government has banned the trading and export of all primates (Mack & Eudey, this volume; R. Ali, pers. comm., 1981; V.N.K. Pillai, pers. comm., 1981). This legislation has been interpreted to include a ban on the export of parts and derivatives of primates including, for example, rhesus plasma samples (Talwalker, 1981).

India was a major exporter of primates, almost all of which were rhesus monkeys, from the 1930's to 1978 (Beddow Bayly, 1957; Conway, 1966; A. Kumar, pers. comm., 1982; Mack & Eudey, this volume). Since then, exports have been reduced to insignificant numbers (Kavanagh, this volume).

Legislation in Habitat and User Countries

+ **Indonesia:**

Hylobates agilis, *H. klossii**,
H. lar, *H. moloch**, *H. muelleri*,
H. syndactylus.[6]
Macaca fascicularis, *M. maura**,
M. nemestrina, *M. nigra**,
*M. ochreata**, *M. pagensis**,
*M. tonkeana**.
*Nasalis concolor**[6], *N. larvatus*.
Nycticebus coucang.
Pongo pygmaeus.
*Presbytis aygula**, *P. cristata*,
P. frontata, *P. hosei*, *P. melalophos*, *P. potenziani**,
P. rubicunda, *P. thomasi**.
Tarsius bancanus, *T. spectrum*.

M. fascicularis, *M. nemestrina*, *P. cristata*, *P. hosei and P. melalophos* are not protected; permits for their local transport and export can be obtained from the Directorate of Nature Conservation (PPA). All other primates are protected; permits for their local transport and export can be obtained from, and must be signed by, the Minister of Agriculture (Anon., 1982f; WWF Indonesia, 1980).

Numerous confidential letters in WTMU files indicate that Indonesia was a regular source of illegally exported primates in the 1960's and 1970's, including orang-utans. To a certain extent, this trade has probably continued at least until recently, but details are difficult to obtain (WWF Indonesia, 1980). Indonesia has been a major source of monkeys since at least 1970 and is now the biggest exporter in the world, with long-tailed macaques being exported in the greatest numbers (Darsono, 1979; Anon., 1979a; Kavanagh, this volume; Mack & Eudey, this volume).

+ **Iran:** No wild or feral primates.

Iran is a very minor importing country (Kavanagh, this volume).

Iraq: No wild or feral primates.

Malaysia exported 20 primates to Iraq in 1978 (Nordin & Hasnah Samian, 1981), but Iraq does not appear to have had any other involvement with the trade.

+ **Israel:** No wild or feral primates.

Primates may be imported with a license from the Veterinary Services of the Ministry of Agriculture (E. Benhar, pers. comm., 1982; D. Perry, pers. comm., 1982).

Exact details are not available, but the government has regularly imported rhesus monkeys, baboons and green monkeys for its agencies. Altogether these have amounted to about 250 per year. Very small numbers, totalling fewer than 50 per year, are imported by individual research institutes (E. Benhar, pers. comm., 1982).

+ **Japan:**

Macaca cyclopis (introduced),
*M. fuscata**.

Until Japan joined CITES in 1980, there were no specific regulations pertaining to the import and sale of primates (S. Honjo, pers. comm., 1979; Y. Kawanishi, pers. comm., 1979).

There is no significant export trade (see Mack & Eudey, this volume, for U.S.A. figures) but Japan is one of the big importing countries, bringing in thousands of primates annually, especially from Bolivia and Indonesia. The volume of imports declined sharply in 1974, and again in 1980, due largely to a drop in imports from Asian habitat countries (Kavanagh, this volume). For a report on ape imports, see Nishida & Uehara (1982).

Kampuchea:

Hylobates concolor, *H. pileatus*.
Macaca arctoides, *M. fascicularis*,
M. nemestrina.
Nycticebus coucang.
Presbytis cristata.
(P.D. Jenkins, pers. comm., 1982).

No known trade apart from 90 unidentified primates that were sent to Japan in 1970 (Kavanagh, this volume).

Korea (North): No wild or feral primates.

North Korea is a very occasional importer of small numbers of primates (Kavanagh, this volume).

Korea (South): No wild or feral primates.

Incomplete foreign trade statistics examined (by Kavanagh) at the U.S. Department of Commerce in Washington, D.C. revealed that 48 "live monkeys" were imported by South Korea from Japan between 1978 and 1981, and five were exported by South Korea to Austria in the same period. No other evidence is available to suggest a South Korean involvement in the primate trade.

Kuwait: No wild or feral primates.

There are no laws concerning the import and export of primates (WTMU files, 1974).

Pakistan and Indonesia are known to have exported a combined total of 76 monkeys to Kuwait since 1967 (WTMU files; Darsono, 1979) but no other involvement in the primate trade is known apart from a single green monkey sent from Tanzania during 1981 (B.A. Kamara, pers. comm., 1982).

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[6] Both of these species are sometimes placed in their own genera: *Symphalangus syndactylus* and *Simias concolor*.

Laos:
Hylobates concolor, H. pileatus.
Macaca arctoides, M. assamensis,
M. fascicularis, M. mulatta,
M. nemestrina.
Nycticebus coucang, N. pygmaeus.
Presbytis cristata, P. francoisi,
P. phayrei.
Pygathrix nemaeus.
(Chivers, 1977).

Since at least 1964, Laos has been a regular, but minor, exporter of primates. Many of the animals have gone to Japan and the U.S.A. (Mack & Eudey, this volume; Nishida & Uehara, 1982). Laos is believed to provide a route out of Thailand for smuggled wildlife including gibbons (Anon., 1978; W.Y. Brockelman, pers. comm., 1980).

Lebanon: No wild or feral primates.

Lebanon appears to be a very occasional, minor importer of primates. Thailand, Ethiopia and Senegal record very small numbers of exports to Lebanon since 1970 (Eudey, 1978; confidential source, 1973; Kavanagh, this volume).

+ **Macau (Portugal):** No wild or feral primates.

There are no laws concerning the protection of wildlife (WTMU files, 1974).

The U.S.A. imported twenty unidentified primates from Macau in 1978 (Mack & Eudey, this volume), but there is no other evidence of Macau's involvement in the primate trade.

+ **Malaysia:** Geographical and legal divisions require that this country be treated here as three territories, Peninsular Malaysia, Sabah, and Sarawak.

Peninsular Malaysia:
Hylobates agilis, H. lar.
H. syndactylus
(Macaca arctoides?),
M. fascicularis, M. nemestrina.
Nycticebus coucang.
Presbytis cristata, P. melalophos,
P. obscura.
(Marsh & Wilson, 1981).

Sabah:
Hylobates muelleri.
Macaca fascicularis,
M. nemestrina.
Nasalis larvatus.
Nycticebus coucang.
Pongo pygmaeus.
Presbytis cristata, P. hosei,
P. rubicunda.
Tarsius bancanus.
(Medway, 1977).

Sarawak:
Hylobates muelleri.
Macaca fascicularis,
M. nemestrina.
Nasalis larvatus.
Nycticebus coucang.
Pongo pygmaeus.
Presbytis cristata, P. frontata,
P. hosei, P. melalophos,
P. rubicunda.
Tarsius bancanus.
(Medway, 1977).

The federal wildlife laws, under the Protection of Wildlife Act 1972 and its 1978 amendment, apply only to the Peninsula. Under these laws, the export of any gibbons is illegal. Other primate species are protected and may only be trapped under license and exported for declared scientific purposes. Trapping licenses and export permits may only be issued by the Department of Wildlife and National Parks (Nordin & Hasnah Samian, 1981).

Trapping and export of wildlife in Sabah is regulated by the Sabah Fauna Conservation Ordinance 1963 and its 1972 amendment which are enforced by the Wildlife Section of the Sabah Forest Department. No exports of primates are allowed (Sabah Forest Deparment information, 1982).

In Sarawak, the National Parks and Wildlife Office of the Sarawak Forest Department administers the Wildlife Protection Ordinance 1958. Primates may not be exported without license, none of which has been granted in recent years (Sarawak Forest Department information, 1984).

Peninsular Malaysia is a major world source of long-tailed macaques. Demand, and hence exports, rose dramatically after the Indian ban on the export of rhesus monkeys in 1978. However, the Malaysian government reacted quickly with the 1978 amendment to its own wildlife laws, and as a result, fewer export permits have been granted and the total numbers of primates exported have dropped again (Kavanagh, this volume; Nordin & Hasnah Samian, 1981). The federal government plans to introduce a ban on the commercial export of all primates in 1984 (Anon., 1983)[7]. There is some local use of primates for research (Kavanagh, *et al.*, 1981).

There is no known primate trade involving Sabah or Sarawak.

+ **Nepal:**
Macaca assamensis, M. mulatta.
Presbytis entellus.

Under the National Parks and Wildlife (Protection) Act 1973, primates may not be hunted, trapped or exported without the written recommendation of the Forest Ministry (WTMU files, 1975; B.M. Marriott, pers. comm., 1980).

Although there may have been some illegal trapping and smuggling of rhesus monkeys into India prior to 1978 (J. Teas, pers. comm., 1980), no other involvement in the primate trade is known for Nepal.

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[7] This ban is now in effect, as of June 15, 1984.

+ Pakistan: *Macaca mulatta.*
Presbytis entellus.

The export of mammals and reptiles and their derivatives was stopped from September 1, 1981, for a period of three years (Ghalib, 1981). In the absence of this ban, the law still provides that permits are required for the trapping and export of primates. The National Council for the Conservation of Wildlife and the Ministry of Agriculture are responsible for administering these permits. Few have been issued in recent years (A.F. Richard, pers. comm., 1982).

During the 1960's, Pakistan was a major exporter of primates to the U.S.A. (Mack and Eudey, this volume), and it continued to export to Europe, Japan and the U.S.A. until 1972 (WTMU files; Anon., 1979b). Exports ceased after 1972. Small numbers of monkeys are trapped for local sale as pets, and for use by the Biology Department of Quaid-I-Azam University (A.F. Richard, pers. comm., 1982).

+ Philippines: *Macaca fascicularis.*
Nycticebus coucang.
Tarsius syrichta.*

Macaques may be trapped with a license from the Bureau of Forestry and exported with a veterinary certificate and a license from the Parks and Wildlife Section of the Bureau of Forestry (A.T. Viri, pers. comm., 1980).

The Philippines has been a major, worldwide exporter of long-tailed macaques since at least 1964. The number of monkeys involved dipped to a very low level in the early 1970's, but has since risen dramatically to make the Philippines the most important single supplier country to the U.S.A. during 1980 and the second biggest exporter of primates in the world (behind Indonesia) since 1978 (Kavanagh, this volume; Mack & Eudey, this volume; A.T. Viri, pers. comm., 1980).

Saudi Arabia: *Papio hamadryas.*
(Napier & Napier, 1967).

No known exports. Saudi Arabia is thought to have imported six unidentified primates from Ethiopia between 1970 and 1972 (official Ethiopian export statistics, WTMU files, 1973) but no other involvement in the trade is known.

Singapore: *Macaca fascicularis.*
Nycticebus coucang. (possibly extinct).
Presbytis melalophos (possibly extinct).

Wild animals may be imported or exported with the permission of the Primary Production Department of the Ministry of Law and National Development (Primary Production Department information, 1976). An export permit from the country of origin is required for all wildlife imports, including those destined for re-export (Mack & Eudey, this volume).

Singapore has been a regular, but very minor exporter of primates since at least 1968 (Anon., 1979a; Mack & Eudey, this volume), but it seems unlikely that many (if any) of these animals were from Singapore since the island has only tiny remnant primate populations at best. Exports virtually ceased after 1976.

+ Sri Lanka: *Loris tardigradus.*
Macaca sinica.*
Presbytis entellus, P. senex.*

The export of all animals, dead or alive, is illegal except where a special permit is granted by the government (T.A. Bongso, pers. comm., 1981; W.P.J. Dittus, pers. comm., 1979).

Few exports have been permitted since 1970, including about twelve unidentified primates that went to Japan in 1977 and 1978. (Anon., 1979a). The U.K. reported a small number of imports from Sri Lanka in 1979 and 1980 (Kavanagh, this volume). Some toque macaques are used in malaria research at the University of Peradeniya (BBC, 1982).

Taiwan: *Macaca cyclopis*.*

It is illegal to export wild animals or stuffed specimens from Taiwan (Anon., 1974).

Taiwan was a minor exporter of primates during the early 1970's (Kavanagh, this volume; Mack & Eudey, this volume), and some of the animals involved were protected species from other countries (J.B. Rober, pers. comm., 1972). There may be some trapping and shooting of macaques in the central mountainous area (Wayre, 1969). Taiwan is also a major importer of primates, especially young long-tailed macaques for the pet trade (Nordin & Hasnah Samian, 1981). These are obtained from Indonesia, Malaysia and the Philippines (Darsono, 1979; Nordin & Hasnah Samian, 1981; A.T. Viri, pers. comm., 1980), although imports from Malaysia abruptly declined when that country imposed an application system.

+ Thailand: *Hylobates agilis, H. lar, H. pileatus.*
Macaca arctoides, M. assamensis, M. fascicularis, M. mulatta, M. nemestrina.
Nycticebus coucang.
Presbytis cristata, P. melalophos, P. obscura, P. phayrei.

The hunting, trading and export of all primates has been banned since 1975, except for specified educational purposes or scientific research approved by the Wildlife Conservation and Protection Committee; gibbons (*Hylobates* spp.) were given this protection in 1961 (Saiwichian, 1978). The legal basis for this protection is the Wild Animals Preservation and Protection Act B.E. 2503, which was passed in 1960. Enforcement is by the Wildlife Conservation Division of the Royal Forest Department (Phairot Suvanakorn, pers. comm., 1982).

Thailand was a major exporter of a wide variety of primates until 1976 and a very low level of exports has continued since then in spite of the ban (W.Y. Brockelman, pers. comm., 1980; Eudey, 1978; Kavanagh, this volume; Y. Kawanishi, pers. comm., 1981; Mack & Eudey, this volume). Since 1975, 102 primates have been legally exported with government permission (Phairot Suvanakorn, pers. comm., 1982). During the 1960's and early 1970's, Thailand was undoubtedly a major source of endangered species, such as orang-utans, many of which had been smuggled out of their countries of origin (WTMU file correspondence from B. Lekagul, 1968 and J. Perry, 1969). This trade had not been entirely stamped out by 1980 (W.Y. Brockelman, pers. comm., 1980).

The wording of the wildlife laws, which permitted individuals to possess two primates of a given species as pets, made successful prosecution of domestic primate traders very difficult (Phairot Suvanakorn, pers. comm., 1982); in 1981 lar gibbons, long-tailed macaques and slow lorises were freely available for sale on the streets of Bangkok (Bennett, pers. obs., 1981). Recently, some sections of the wildlife laws were changed to permit Thailand to ratify CITES (A. Eudey, pers. comm., 1983).

+ **United Arab Emirates (U.A.E.):** No wild or feral primates.

The Ministry of Agriculture and Fisheries (H.A. Salman, pers. comm., 1982) reports that there is no information to suggest any trade in primates, although the U.K. exported four monkeys to the U.A.E. in 1981, and the Philippines exported five (Kavanagh, this volume). The U.K. also exported a few primates to Abu Dhabi between 1979 and 1981 for zoo purposes (B.M.B. Pape, pers. comm., 1982).

Vietnam:
Hylobates concolor, H. pileatus.
Macaca arctoides, M. assamensis, M. fascicularis, M. mulatta, M. nemestrina.
Nycticebus coucang, N. pygmaeus.
Presbytis cristata, P. francoisi, P. phayrei.
Pygathrix nemaeus.
*Rhinopithecus avunculus**.
(Dao Van Tien, pers. comm., 1982).

Apart from 24 unidentified primates that were exported to Japan in 1973 (Anon., 1979a), Vietnam has not been involved in the primate trade since at least 1966 (Dao Van Tien, pers. comm., 1982). There is, however, some internal use, mainly of macaques for biomedical research (Westing and Westing; 1981; Dao Van Tien, pers. comm., 1982).

Yemen (North):
Papio hamadryas.
(Napier & Napier, 1967).

No known trade.

Yemen (South):
Papio hamadryas.
(Napier & Napier, 1967).

There are no laws directly concerned with the import and export of wildlife, but all imports and exports of all natural and manufactured products are strictly controlled and licensed by nationalized government companies (WTMU files, 1975).

Official Ethiopian export statistics (confidential source, 1973) show that thirty unidentified primates were sent to South Yemen in 1972, but no other connection with the primate trade is known.

D. North America

+ **Bermuda (U.K.):** No wild or feral primates.

Bermuda is a dependent territory of the U.K. and is included in the British Instrument of Ratification of CITES.

Small numbers of lar gibbons and stump-tailed macaques of American origin have been transferred between Bermuda and the U.S.A. in connection with the establishment of small research colonies of these animals on the island (U.K. Department of Environment information, 1970).

Canada: No wild or feral primates.

The management of wildlife in Canada falls under thirteen jurisdictions; ten provincial, two territorial and one federal government. However, it is the federal government that administers CITES because the regulation of international trade is a federal responsibility. Import and export control measures are carried out by the federal Department of Industry, Trade and Commerce under the Export and Import Permits Act and its amendments. All trade in primates is controlled according to the requirements of CITES. Trade in primates is additionally subject to the regulations of Agriculture Canada and the Federal Department of Health (Canadian Wildlife Service information, 1982).

Canada is a regular and quite important trader in primates (Kavanagh, this volume). The U.S.A. re-exports several thousand primates to Canada each year for biomedical research (Mack & Eudey, this volume).

United States of America: *Macaca fascicularis?* (introduced and possibly established in Florida),
M. mulatta (introduced and established in Florida).
Saimiri sciureus? (introduced and possibly established in Florida).

The Endangered Species Act of 1973 and its subsequent amendments provide for the implementation of CITES. The U.S.A. was the first nation to ratify the Convention and its regulations incorporate all of the basic provisions of the Conventions incorporate all of the basic provisions of the Convention's articles. It banned the importation of primates as pets in 1975 (Mack & Eudey, this volume).

As described in detail by Mack & Eudey (this volume), the U.S.A. is the world's largest importer of primates, although the numbers involved have dropped considerably since their peak in 1968. The U.S.A. is also a major exporter of live primates.

E. Australasia and the Pacific

+ **Australia:** No wild or feral primates.

The importation and trading of all wildlife are strictly controlled, and permits must be obtained from the Quarantine Service of the Commonwealth Department of Health (Strahan, 1974).

Australia has regularly imported between 100 and 600 primates per year since 1975 (J.D. Ovington, pers. comm., 1980; N.C. Gare, pers. comm., 1982; Kavanagh, this volume).

New Zealand: No wild or feral primates.

Under the Animals Act 1967, permits for the import and export of primates must be obtained from the Ministry of Agriculture and Fisheries (G.J. Blake, pers. comm., 1981; T.P. Fisher, pers. comm., 1982).

No import or export permits for primates were issued between 1976 and 1980, according to the Ministry (G.J. Blake, pers. comm., 1981), but U.K. sources report the export of at least 27 monkeys to New Zealand during that period, and a few more since then (Kavanagh, this volume).

+ **Palau Islands (U.S.A. Trust Territory):** *Macaca fascicularis* (introduced).

No known trade.

F. Europe

+ **Austria:** No wild or feral primates.

Austria is a regular, but minor importer of primates (Eudey, 1978; Kavanagh, this volume). Prior to Austria's accession to CITES, evidence of the fulfillment of export formalities was not necessary for the importation of primates (R.E. Hackett, pers. comm., 1980). The country was therefore an open conduit for smuggled animals. This situation has now changed and two days after the entry into force of CITES, the Austrian management authority seized ten chimpanzees and one pygmy chimpanzee that were imported without proper export documents. Nine of the animals came from Zaire (Anon., 1982g).

+ **Belgium:** No wild or feral primates.

Prior to Belgium joining CITES on January 1, 1984, there were no specific laws about the import, care, or experimentation of primates (Mortelmans, 1978).

Since Belgium did not require any evidence of compliance with the laws of the exporting country when a primate was being imported (R.E. Hackett, pers. comm., 1980), it was an important route for smuggled animals. The significance of this certainly includes threats to endangered species. For example, in 1973 there was evidence of 13 orang-utans for sale in Belgium (confidential source, 1973) and in 1982 a newspaper reporter was able to purchase a gorilla that had been smuggled out of Zaire (confidential source, 1982). As late as the end of 1983, Belgium was still importing endangered primate species including golden-headed lion tamarins, *Leontopithecus chrysomelas* (Kavanagh, this volume). Records from other countries, especially Malaysia, Indonesia and the U.K., show Belgium to be a regular importer of several hundred primates per year (Kavanagh, this volume). It also re-exports primates.

Bulgaria: No wild or feral primates.

Official Ethiopian exports statistics (confidential source, 1973) record 30 primates as being sent to Bulgaria in 1969 and five zoo specimens were sent from the U.K. between 1976 and 1981 (Kavanagh, this volume), but there is no other available evidence of primate trade.

Czechoslovakia: No wild or feral primates.

Czechoslovakia is an occasional and minor importer of primates (Eudey, 1978; Kavanagh, this volume; confidential source, 1973).

+ **Denmark:** No wild or feral primates.

Under Statutory Order No. 396 (1965) from the Ministry of Agriculture, primates may be imported for scientific research or by approved zoos with permits from the Veterinary Directorate and the Ministry of Environment. Within Denmark, primates may only be sold to approved zoos or scientific institutions, or for export (Fennestad, 1977; B. Sloth, pers. comm., 1980).

Denmark regularly imports at least a few hundred monkeys per year for research purposes and for an illegal pet trade (Kavanagh, this volume).

+ Finland: No wild or feral primates.

Under a 1975 act, primates may be imported for scientific purposes and by zoological gardens with permits from the Veterinary Department of the Ministry of Agriculture and Forestry (Hyvarinen & Linnankoski, 1979a).

There is almost no use of primates in Finland apart from a small breeding colony of stump-tailed macaques in Helsinki for purposes of physiological research (Hyvarinen & Linnankoski, 1979b; D. Lundgren, pers. comm., 1980). Imports and exports are insignificant (Kavanagh, this volume).

+ France: No wild or feral primates.

Certain species may be imported for scientific research with a permit from the Ministry of Agriculture (Mahouy & Milhaud, 1978).

France is one of the major primate importing countries, with a particularly large requirement for animals for vaccine testing and preparation (Hobbs, 1975). Since few of the animals that are used appear to be captive-bred (Anon., 1981c), they must be imported, although the numbers of imports that are reported are quite low (Caldecott & Kavanagh, this volume). The U.S.A. exports about 2,000 primates to France each year (Mack & Eudey, this volume).

+ Germany (East): No wild or feral primates.

Small numbers of primates are known to be imported and exported (Kavanagh, this volume).

+ Germany (West): No wild or feral primates.

In 1967, following an outbreak of Frankfurt-Marburg virus, the importation of primates was declared to be illegal, except for monkeys in professional entertainment. The transit of primates also became illegal, except for periods on board aircraft temporarily landed at a German airport. Exceptions to the ban are possible if there is no danger of the introduction of contagious diseases. These exemptions are coordinated by the state of Hessen and are allowed only on the fulfillment of several conditions relating to health care (Meister, 1977).

West Germany uses more than two thousand primates per year for research, especially vaccine testing. Arrangements for captive breeding are growing rapidly (Caldecott & Kavanagh, this volume).

+ Gibraltar (U.K.): *Macaca sylvanus* (introduced).

Gibraltar is included in the U.K. Instrument of Ratification of CITES as a British dependent territory. The provisions of the Convention are applied in the colony under the Endangered Species (Import and Export) Ordinance 1976. Listed primates (most species, including the Barbary macaque) may only be imported or exported if the Financial and Developmental Secretary grants a license, and he must first consult with the Scientific Authority.

A total of 85 Barbary macaques are known to have been exported from Gibraltar since 1936. These exports were controlled under the British Army's policy. All went to zoos and wildlife parks and none for biomedical research. Until recently, the Army failed to follow the procedures laid down in the 1976 Ordinance, but this shortcoming has recently been rectified (J.E. Fa, pers. comm., 1982).

Greece: No wild or feral primates.

The import or export of any wild animals is illegal without a permit from the Ministry of Agriculture (WTMU files, 1973).

Greece imports small numbers of primates (Eudey, 1978; Nordin & Hasnah Samian, 1981; Kavanagh, this volume; Greek Ministry of Agriculture Veterinary Service information, 1982).

Hungary: No wild or feral primates.

Imports are allowed under the auspices of the Hungarian Cooperative Enterprise for Game Trading (E. Szenes, pers. comm.).

There are a few records of imports and exports concerning Hungary, but the numbers are insignificant (Eudey, 1978; C. Boydell, pers. comm., 1980; Kavanagh, this volume).

Ireland: No wild or feral primates.

All imports and exports are regulated by the Minister for Lands under the provisions of the Wildlife Act 1976 (Irish government information, 1976).

The Republic of Ireland is a very minor importer of primates (Caldecott & Kavanagh, this volume).

+ Italy: No wild or feral primates.

The importation of all primates, except those for circuses, is dependent on the previous authorization of the Health Department (Ministerial Decree, 1968). An export license and a certificate of origin are both required from the country of origin and a specific import license is required from the "Ministero del Commercio con l'Estero" (G. Ardito, pers. comm., 1982).

During the mid-1970's, Italy used about one thousand primates per year, all for vaccine testing (Hobbs, 1975). Few, if any, of these animals are captive-bred (Hobbs, 1975; Anon., 1979b), and Italy remains a major, regular importer of primates (Kavanagh, this volume). Large-scale captive-breeding operations are being developed (Caldecott & Kavanagh, this volume).

+ **Jersey (U.K.):** No wild or feral primates.

The Bailiwick of Jersey is included in the U.K. Instrument of Ratification of CITES as a British dependent territory.

The numbers of primates imported and exported are insignificant (U.K. Department of the Environment information, 1982). It is likely that they all involve the Jersey Wildlife Preservation Trust.

+ **Luxembourg:** No wild or feral primates.

Primates are not used in Luxembourg (Hobbs, 1975; P. Decker, pers. comm., 1982). Japan imported seven unidentified primates from there in 1980 (Kavanagh, this volume).

Netherlands: No wild or feral primates.

Under the law on Exotic, Endangered or Threatened Species 1977, the importation and trading of primates is illegal without a permit from the Ministerie van Cultuur, Recreatie en Maatschappelik Werk (Brinkert, 1977; C. Goosen, pers. comm., 1980).

The Netherlands is a major user and an important transit point for primates imported into Europe, many of which come from Indonesia (Caldecott & Kavanagh, this volume; Kavanagh, this volume). National research needs in the mid-1970's were estimated at between one and two thousand animals per year, most of which were used in vaccine testing (Hobbs, 1975). Efforts are being made to captive-breed primates for research (Hobbs, 1975; Goosen, 1978).

+ **Norway:** No wild or feral primates.

It is illegal to import primates into Norway (P.J. Schei, pers. comm., 1981).

There is no laboratory use of primates in Norway, but some Norwegian research projects involving primates have been carried out in Sweden. Very few animals are involved (D. Lundgren, pers. comm., 1980). Official Ethiopian export statistics (confidential source, 1973) recorded the export of six primates to Norway in 1979 (Kavanagh, this volume), but no other imports or exports have been noted.

Poland: No wild or feral primates.

The known number of primates that cross Poland's borders is insignificant (Kavanagh, this volume).

+ **Portugal:** No wild or feral primates.

There is no known trade, although it is hard to believe that there has never been any transfer of primates between Portugal and its former African and Asian possessions, particularly before these territories achieved independence.

Spain: No wild or feral primates.

Primates which are "domestic pets" may be imported freely, except where the local authorities have decided otherwise in response to international pressure to stop the trade in the photography of chimpanzees for tourists. The Ministry of Commerce forbids the importation of chimpanzees for commercial purposes and regulates imports of other primates with a system of permits (B. Templer, pers. comm., 1982; Anon., 1982a).

Spain regularly imports primates, particularly from Indonesia, but not in large numbers (Kavanagh, this volume). As is the case for the Canary Islands, the legal loophole whereby "pets" may be imported freely is exploited for the importation of baby chimpanzees for the beach photography trade. These apes mainly come from Equatorial Guinea, but also from other countries such as Sierra Leone and Belgium (B. Templer, pers. comm., 1982). At least one estimate places the number of animals used by beach photographers at over 200 at any one time (Anon., 1980d).

+ **Sweden:** No wild or feral primates.

During the fiscal year 1978-79, about 1,750 primates were imported, mainly for use in vaccine production (D. Lundgren, pers. comm., 1980). Sweden is a regular importer of several hundred primates per year, almost all of which are used by the National Bacteriological Laboratory (D. Lundgren, pers. comm., 1980).

+ **Switzerland:** No wild or feral primates.

All primates imported or in transit require permits from the Federal Veterinary Office. Permits are only issued for primates for zoo, circus and laboratory purposes (Dollinger, 1979).

In the mid-1970's, Switzerland was estimated to have an annual requirement of about 300 primates per year, many of which were needed for studies related to neurology and behavior (Hobbs, 1975). Relatively small numbers are imported annually (Kavanagh, this volume).

+ **Union of Soviet Socialist Republics:** No wild or feral primates.

It is extremely difficult to obtain information about Russian trade in or use of primates, but Kenya alone exported 1,785 green monkeys to the U.S.S.R. between June, 1978 and May, 1979 (C. Boydell, pers. comm., 1980), and the U.S.S.R. is believed to have placed a single order for 750 hamadryas baboons and 2,070 green monkeys with a Dutch company in 1981 (confidential source, 1981). It is reasonable to conclude that the U.S.S.R. is a major user of primates (Caldecott & Kavanagh, this volume).

+ **United Kingdom:** No wild or feral primates.

The U.K. complies with the requirements of CITES under the Endangered Species (Import and Export) Act 1976 and its subsequent modification. All imports and exports of live or dead primates and their derivatives must be licensed by the Department of the Environment (Kavanagh, 1982; 1983). Wrangham (1980) is incorrect in suggesting that some derivatives of primates may be imported without a license. All imported nonhuman primates must be quarantined for six months in government approved premises under the Rabies (Importation of Dogs, Cats and Other Mammals) Order 1974; all experimental work on primates is subject to regular government scrutiny and may only be conducted with a license from the Home Office issued under the Cruelty to Animals Act 1876 (Hobbs, 1978). See Mouat (1982) for customs procedures.

The U.K. is one of the biggest primate trading and using countries in the world (Caldecott & Kavanagh, this volume; Kavanagh, this volume).

+ **Yugoslavia:** No wild or feral primates.

Yugoslavia is a regular importer of at least a few hundred primates per year from Malaysia and Kenya (Kavanagh, this volume; Nordin & Hasnah Samian, 1981).

IV. Conclusion

Our brief and doubtless incomplete country-by-country review shows that more than 100 states are in some way involved in the international transfer of primates. Many of them lack either the appropriate legislation or the ability to enforce their legislation in order for the trade to be properly regulated. We have not attempted to review the effects of CITES, but if the Convention is accepted as an effective trade regulator, then the large number of trading countries is a powerful argument for its adoption by more of them. Further conclusions are dealt with in the final chapter of this volume.

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A Review of the International Primate Trade

Michael Kavanagh

I. Introduction

No doubt the first primate to be taken from the wild and held in captivity by mankind lived many thousands of years ago. Probably, it became a pet in a village near its natural habitat, or maybe it was simply held captive until a convenient moment arose to kill and eat it. The earliest known examples of trading in primates date back nearly 5,000 years to the beginning of the third millenium B.C. when guenons (*Cercopithecus* spp.) were imported into ancient Egypt as objects of trade and tribute; they usually ended up as pets (Morris & Morris, 1966). Presumably, the sacred baboons (*Papio hamadryas*) that the ancient Egyptians kept in their temples and trained to harvest fruit (Kummer, 1968; Morris & Morris, 1966) also changed hands as part of a commercial transaction from time to time.

The desire to have exotic pets has been stimulating a worldwide trade in primates since the first guenon was sold in Egypt — and maybe even before that. The topic is reviewed comprehensively by Morris & Morris (1966), who describe how the ancient Greeks and Romans were well aware that captive monkeys bite. Barbary macaques (*Macaca sylvanus*) were often kept as pets in Europe from the twelfth century onwards; and during the Middle Ages, the sale of monkeys provided a source of revenue. There was even a tax on monkeys that were brought into Paris. The practice was not confined to Europe: Cooper & Hernandez-Camacho (1975) mention that Colombian Indians kept monkeys as pets three to four hundred years ago, and it is known that South American monkeys had found their way into English households as pets by the sixteenth century (Deinhardt & Gengozian, 1978).

Pet monkeys also travelled from the Old World to the New; many of them must have travelled on the slaving ships out of West Africa and it is their descendants who make up the population of callitrix (green monkeys) and mona monkeys (*Cercopithecus aethiops sabaeus* and *C. mona*) that are today well established on various islands of the West Indies (Napier & Napier, 1967; Sade & Hildreth, 1965). Other island populations of introduced monkeys elsewhere in the world may well be descended from escaped or released pets. As described below, the keeping of primates for pets has remained an important stimulus to the primate trade right up to the present day (see also Mack & Eudey, this volume).

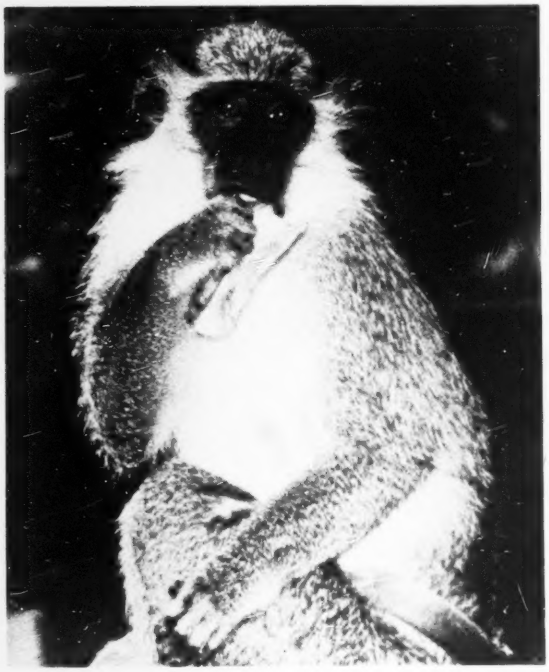
The keeping of primates in zoos is also an ancient practice which remains of importance to the modern trade. The ancient civilization of China, India, Assyria and Egypt set up zoos which almost certainly included monkeys, although the earliest report of one in a zoo dates only from 1680 B.C. (Morris & Morris, 1966). The modern concept of a zoo has its origins in the menageries that were kept by kings and other powerful figures in the early Middle Ages. These institutions have provided a steady demand for primates ever since and it is important to realize that up until the present day they have primarily been consumers rather than producers of captive animals. Their destructive side is well illustrated by a publication of the New York Zoological Society from the beginning of this century; it describes how the agents of the zoo were continually on the lookout for gorillas, but urges the public to visit as promptly as possible when one is obtained as it will doubtless die very quickly (Hornaday, 1907). It is a comparatively recent phenomemon that large numbers of zoos, but by no means all of them, have adopted breeding for conservation purposes as one of their most important goals (Martin, 1975). As described below, zoos continue to provide a steady commercial demand for primates.

Another ancient, but this time trivial, source of demand for primates is the practice of domesticating them for labor. Again, this has been reviewed by Morris & Morris (1966) who trace it back to the ancient Egyptians who certainly used baboons to harvest figs. The current practice of using pig-tailed macaques (*Macaca nemestrina*) to harvest coconuts in Southeast Asia (Nordin & Hasnah Samian, 1981) is very similar, as is that of using them to collect otherwise inaccessible botanical specimens from high up in trees (Corner, 1946). Today, capuchins (*Cebus* spp.) are being tested for use in aiding handicapped people.

Circuses and travelling shows also provide a small market for primates and have done so since ancient Roman times (Morris & Morris, 1966). Since these animals require special training, they must always have been of relatively higher value than would otherwise have been the case and thus of greater commercial significance than their numbers would suggest. Modern day circuses have their origins in the travelling shows of minstrels and jugglers of medieval Europe; and primates still cross international boundaries with circuses and travelling carnivals. In addition, they are trained to perform for the film and television industries.

As mentioned above, primates have been kept in temples since the days of ancient Egypt. They have continued to be associated with man in a religious context to the present day, being among the first animals to be worshipped in India and still found inhabiting temples there and elsewhere in tropical Asia (Morris & Morris, 1966; pers. obs.). However, there is no evidence that religion has ever played a significant role in stimulating the primate trade. Indeed, it has worked against it in instances where monkeys have been protected against sale and export by religiously based public opinion; examples of this are in Mauritius (A.W. Owadally, pers. comm., 1980) and Sri Lanka (T.A. Bongso, pers. comm., 1981).

By far the biggest stimulator of the primate trade today is



Upper left: The vervet or green monkey *(Cercopithecus aethiops)* is an African species that was probably among the first primates to be traded internationally. Pets from this early trade escaped onto several Caribbean islands where they have now become established. This individual is from Barbados, where there is currently some export of animals from a feral population that has been established for several hundred years (photo by R. A. Mittermeier).

Upper right: The olive baboon *(Papio anubis)*, another African species important in the trade. Together with green monkeys, baboons make up the great majority of primates exported from Africa (photo by R. A. Mittermeier).

Lower Left: The orang-utan *(Pongo pygmaeus)*, an endangered species that was once in great demand, both as a pet for local people and in the international trade. It is now officially protected everywhere that it occurs and is listed on Appendix I of CITES, although some small-scale illegal trade may still occur (photo by Andy Young).

Lower right: The golden-headed lion tamarin *(Leontopithecus chrysomelas)*, a highly endangered species from the Atlantic forest region of eastern Brazil. This species has never entered into the legal trade, but has been smuggled into France, Belgium and Japan in the past years. Any trade in this species is a severe threat to its survival (photo by R. A. Mittermeier).

the demand for live animals by biomedical and other research laboratories, most of which are in Europe, North America and Japan. The use of primates in medicine is much older than is generally realized, being traceable back to the days of ancient Mesopotamia where monkey bones were used in the manufacture of drugs (Morris & Morris, 1966). Biomedical research on primate subjects dates back at least to the work of Galen (200 — c.130 B.C.) and that of Vesalius (1514-1564 A.D.), but the first modern impetus for this followed the work of a British physician, David Ferrier, in the late nineteenth century. Ferrier described homologies between human and monkey brains, giving rise to a series of studies, including one by Sherrington in 1917 in which the brains of 22 chimpanzees (*Pan troglodytes*), three orang-utans *(Pongo pygmaeus)* and three gorillas *(Gorilla gorilla)* were examined (Morris & Morris, 1966). By the late nineteenth century, monkeys were also being used in research into tuberculosis and reproductive physiology, and in the early twentieth century, the areas of investigation expanded to include research into polio and syphilis (Inskipp & Wells, 1979; Landsteiner & Popper, 1909; Morris & Morris, 1966).

Throughout the middle years of the twentieth century, the rhesus monkey (*Macaca mulatta*) has been the most used primate in biomedical research (Southwick, 1977), but its original choice was due partly to chance availability; rhesus monkeys could be obtained in large numbers from India. However, once this opportunity had been capitalized upon, the demand increased because the body of information that was steadily gained facilitated subsequent work (N.I.H., 1978). Similarly, the squirrel monkey (*Saimiri sciureus*) became the subject of behaviorial experiments fifty years ago (Kluver, 1933) but it was due to its ready availability on the pet market that it became established as a biomedical subject in the late 1950's (Cooper, 1968).

In more recent years, scientists' demands have become rather more sophisticated, with certain species being required for certain areas of research, usually because of specific physiological or disease-related characteristics (see Caldecott & Kavanagh, this volume; Eudey & Mack, this volume). However, the substitution of one species for another is still possible in many areas of research. For example, the introduction of rhesus monkey export quotas and finally an outright ban on exports by India in 1978 brought about a dramatic increase in the demand for long-tailed macaques (*Macaca fascicularis*)[1] (Nordin & Hasnah Samian, 1981). The supply of primates for research is very much subject to political circumstance and many more countries today restrict or prohibit the export of their primates than was the case twenty years ago (Held, 1982; Kavanagh & Bennett, this volume; Mack & Eudey, this volume; Savage, 1976; Southwick, 1977). This trend, and the awareness that natural primate populations were diminishing and might not continue to be available regardless of government decisions, led to acute concern about the supply of wild primates and recommendations that steps should be taken by user countries to produce their own animals (e.g. Balner, 1978; Cavey & Ter Haar, 1979; Conway, 1966). Considerable action has been taken along these lines in recent years and it is reviewed elsewhere in this volume.

In spite of the importance of primates in research, no reliable figures for worldwide trade totals have ever been available. Inskipp & Wells (1979) report that laboratory demand for primates was "still relatively low" in the 1940's. It increased rapidly, however, and reached a peak in the 1950's when polio vaccine development and production was at its peak. Inskipp & Wells (1979) estimate that 1.5 million monkeys were used in polio vaccine production between 1954 and 1960, and that the U.S.A. was importing 200,000 rhesus monkeys per year from India alone during that period. Figures published by Conway (1966) are somewhat lower than these (Table 1), averaging 196,412 animals per year for the available statistics of all primates (including thousands for the pet trade) imported to the U.S.A. between 1955 and 1960. Available figures on primates (rhesus monkeys and "langurs"[2]) imported for research purposes alone average 119,620 between 1956 and 1960 (Table 1).

The levels of trade over this period are even less well documented for the rest of the world than they are for the United States. India, Colombia and Peru were certainly the western world's major suppliers of primates, but animals also came from other sources along channels that were almost entirely unregulated and unrecorded (Inskipp & Wells, 1979). India was one of the first countries to attempt any sort of rational management of the trade by introducing a requirement for a "Certificate of Need" in 1956. This had to state that the monkeys were required for use at an approved institution, otherwise they could not be exported (R.E. Hackett, pers. comm., 1980; Harrisson & Roth, 1969). Before that, it was only necessary to obtain a veterinary certificate, and that could be bought without any veterinary examination of the animals (R.E. Hackett, pers. comm., 1980).

All this simply serves to show that even the best documented figures may be unreliable and that huge numbers of primates were undoubtedly being exported from habitat countries during the 1950's. It was inevitable that this would create a drain upon the wild populations, particularly in view of other pressures upon them from habitat destruction and human predation (e.g. Bernstein *et al.*, 1976; Rainier & Bourne, 1977; Wolfheim, 1983). Furthermore, the drain on wild populations may have been more acute than the trade figures would at first indicate. Harrisson & Roth (1969) report that the U.S.A. was importing mainly juvenile monkeys in the 1950's, "so the projected loss in population numbers is five times higher" (p. 120). No basis is given for this estimate and it may well be unreasonably high, but certainly the specific collection of females of breeding age, to give a realistic example (Nolan, 1975a), would be more detrimental to a population than the collection of a random sample of age-sex classes (see Dittus, 1977). Mortalities between trapper and research laboratory also serve to increase the drain on wild populations for any given level of demand. Figures for this are notoriously difficult to find, but estimates range from 10% to 71% of the animals trapped, depending on the circumstances and how the measure is made (Darsono, 1979; Harrisson, 1971; Mack & Eudey, this volume; Nordin & Hasnah Samian, 1981).

Primates comprise less than one percent of the animals that are used in U.S. research laboratories (N.I.H., 1980) but they are in much shorter supply than the rodents and rabbits that make up the clear majority (Bruhin & Gelzer, 1979). Unlike rodents and rabbits, however, laboratory primates are still being taken from the wild in numbers that are significant in relation to the sizes of the natural populations. The effects of trapping for research and for the zoo and pet markets are poorly documented, but there is evidence that it has led to declines in the populations of *Macaca mulatta* in India (Southwick, Siddiqi & Siddiqi, 1970), *M. fascicularis* in Thailand (Nordin & Hasnah Samian, 1981), *M. arctoides* in Southeast Asia, *M. fascicularis* in the Philippines, *M. silenus* in India and *Pan troglodytes* in Africa (Southwick, 1977). For reviews of the conservation status of primates in relation to trapping and other factors, see Gartlan *et al.* (in press), Harrisson (1971), and Rainier & Bourne (1977).

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[1] *Macaca fascicularis* (=*M. irus*) is known as the long-tailed macaque, the cra eating macaque, cynomolgus monkey, Java macaque, the Philippine monkey or the kera.

[2] Presumably *Presbytis* spp.

In this chapter, I attempt to document the movement of nonhuman primates from their places of origin to wherever there is a demand. Reports are provided on species, numbers and destinations involved in the primate trade. Little consideration is given to mortality rates, uses, captive breeding or methods of transportation, except insofar as these topics may serve to illuminate the main emphasis of the review. Furthermore, because the primate trade involving the United States is so vast and can be documented in so much detail, it is dealt with in a separate chapter (see Mack & Eudey, this volume). Captive breeding and the specific uses of primates are also dealt with elsewhere (see Eudey & Mack, this volume, for U.S.A.; Caldecott & Kavanagh, this volume, for outside the U.S.A.).

For detailed descriptions of trapping, collecting and other aspects of how the trade actually operates, see Anon. (1978), Cooper (1968), Darsono (1979), Gerard (1977), Hackett (1977), Joss (1978), Laursen (1978), Markfield (1972), Middleton *et al.* (1972), Mittermeier *et al.* (1977), Morris & Morris (1966), Nolan (1975 a & b), Nordin & Hasnah Samian (1981), Soini (1972), Tribe & Bassett (1978), Tsalickis (1972), and Valerio (1978).

For a brief review of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), national laws relating to primate trade and a listing of primate species by habitat countries, see Kavanagh & Bennett (this volume). For a more general review of the international wildlife trade, see Inskipp & Wells (1979).

The information that is presented in this chapter is based largely on:

a) annual reports that parties to CITES are required to submit to the CITES secretariat under Article VIII of the Convention;

b) responses to hundreds of questionnaires that were sent out between early 1979 and mid-1982 to as many potential sources of information as possible. Some of the answers came back in the form of official statistics, others as personal communications. All unpublished data that are cited in this paper are filed at the Wildlife Trade Monitoring Unit (WTMU), IUCN Conservation Monitoring Centre, Cambridge, England, where they may be inspected by arrangement; and

c) responses to a preliminary draft of this chapter which was widely distributed for comment.

Inevitably, the material reported in this chapter is heavily biased towards that which involves those countries, people and agencies which are efficient in record-keeping and which are prepared to make those records available. Under these circumstances, the report cannot be said to provide a realistic assessment of such covert trade as may occur but, on the positive side, a considerable array of primate trade statistics has been gathered together for the first time and sufficient information is available from the major trading countries to give an indication of current trade volumes.

II. Current Trading: Problems with the Data

The advent of CITES has been responsible for the provision of statistics by many countries, but not all parties to the Convention have reported as required under its terms (Table 2). Indeed, some nations have never submitted annual reports, including two of the original ten parties (Nigeria and the United Arab Emirates).

As of this writing, 1979 was the only year for which a tabulated analysis of CITES annual reports was available. All transactions in live primates from the 33 reporting countries have been extracted from this tabulation and are presented in Table 3. According to the data, 27,077 primates were traded internationally in 1979, but there are some obvious discrepancies in trying to match declared imports with declared exports where animals were transferred between two CITES parties that submitted reports. However, it seems unlikely that this would account for all of the discrepancies between imports and exports; less than 10% of the transactions noted (33 out of 374) were declared by both nations.

The mismatches between imports and exports are due mainly to incomplete reporting by CITES parties and the involvement of countries that are not parties to CITES. The incomplete nature of the reported exports is, if anything, worse than it would appear at first, since Indonesia, Malaysia, Bolivia, Guyana, Paraguay and Kenya — all important traders in primates — are among the CITES parties that did not submit annual reports for 1979 (Table 2). This is illustrated in Table 4 which shows that only three countries reported all of the primates that they are believed to have imported from other CITES parties. Five countries reported fewer than half of their imports as recorded by exporting countries, and a further 20 countries that were not parties to the Convention during 1979 are recorded as recipients of primates from CITES countries. To compensate for the failure of many countries to produce CITES reports, Table 5 provides a more realistic picture of the international primate trade in 1979 (see next section).

The failure of some CITES parties to report has resulted in there being an underestimate of the total trade in Table 3. For example, a cursory examination of Table 15, which is based on Japan's official published Customs statistics, indicates that in 1979 Japan imported thousands of primates from Indonesia and Malaysia; however, these do not appear in Table 3. The figures provided in Table 15 may not be wholly accurate, but Japan is known to have imported large numbers of monkeys from Indonesia and Malaysia during 1979 (Darsono, 1979; Nordin & Hasnah Samian, 1981).

Furthermore, when countries do submit annual reports, these are not always accurate. For example, either Canada was wrong in reporting that 36 chimpanzees were moved from the U.S.A. to Canada in 1979 or the U.S.A. was wrong in failing to report this (Table 3). Numerous other examples of this type of error can be found in Table 3. Some of them probably derive from the fact that many CITES reports are compiled on the basis of permits issued, rather than permits used, and there may be discrepancies between the two. Also, permits may be issued in one year and used in the next.

Because this study was based in the U.K. it has been possible to check the official British statistics against other figures. Mack & Eudey (this volume) and Nordin & Hasnah Samian (1981) have performed similar exercises in the U.S.A. and in Malaysia, respectively, and find discrepancies between different data sets. However, in the majority of cases, no such checking was possible. In the account that follows, credence has often been given to the only set of figures that are available for a particular country. Where there is a reason to doubt the validity of a set of figures, this is made clear in the text.

III. Live Primates: Current Trade Levels and Trends

In this section I discuss those countries that are believed to trade in more than 100 primates annually, or which have played a major role in trade within the recent past. Tables 5 through 17 provide information on live primate imports; tables 18 through 35 give export information. Countries that play only a very small role in the trade are dealt with in the chapter by Kavanagh & Bennett (this volume).

A total of 64,399 imports has been documented for 1979 (Table 5), the year for which most data are available. Table 5 is based upon a tabulated analysis of CITES annual reports from the 33 countries submitting reports that year (Table 3), to which have been added any other imports traced through the references that are given in Table 5. Table 18 summarizes exports in the same way and yields a total of 64,982 primates exported during 1979. Comments on the figures are made in the relevant sections below.

For comparative purposes, Table 19 summarizes the recent imports of the Netherlands, the U.K., Japan, Canada and the U.S.A. by country of export over the period 1978-1981. By using import statistics to measure exports, the problem of differential reporting by exporter countries is overcome. Table 19 combines the best available import statistics that are consistent over the four-year period. The result is an *approximate* measure of the relative importance of the various exporting countries, but the following factors should be considered when interpreting the table:

(i) the heterogeneous nature of the data, with different collection techniques applying to the data from each of the four importers;

(ii) the lack of import statistics from such important, or potentially important, countries as France, West Germany, Italy, Sweden, the U.S.S.R., Taiwan, etc.;

(iii) the inclusion of tree shrews in the U.S. statistics but not elsewhere; tree shrews, Order Scandentia (Eisenberg, 1981), are not treated as primates in this paper; and

(iv) the possibility that some animals are counted twice because of the inclusion of re-export statistics.

A. The European Economic Community (E.E.C.)

Belgium. Prior to Belgium becoming a member of CITES on January 1, 1984, primates could be imported without any legal documentation from the country of export (R.E. Hackett, pers. comm., 1980), which had led to Belgium's becoming a "laundering point" for smuggled, endangered species such as orang-utans (*Pongo pygmaeus*) (R. Fitter, letter to J. Walsh, 14/3/73), a gorilla (*Gorilla gorilla*) in 1982 (C. Aveling, pers. comm., 1982) and at least 29 golden-headed lion tamarins *(Leontopithecus chrysomelas)* as recently as 1983 (Anon., 1984). No documentation of imports is available from Belgian sources but based on exporting countries' statistics, the country is a regular importer of macaques (*Macaca* spp.) from Southeast Asia (Tables 23, 24 & 25) and also imported green monkeys[3] from Kenya during 1980 (Table 30). Belgium imported 842 primates and exported 233 during 1979 according to Tables 5 and 18.

Denmark. This country is a regular, but minor importer of green monkeys and macaques, probably bringing in 200 to 300 annually (B. Sloth, pers. comm., 1980; Table 5).

France. It is difficult to estimate the level of French imports. Exporting sources used to compile Table 5 report a total of 1,299 imports by France in 1979. The fact that the 1979 CITES report from France only lists the importation of 15 live primates illustrates that the French documentation of the trade leaves much to be desired.

Hobbs (1975) estimated France's annual replacement requirement for research from 1973 to 1975 at an average of nearly 4,000. Caldecott & Kavanagh (this volume) suggest that at least 5,000 were used annually in the late 1970's, and Mack & Eudey (this volume) report that the U.S.A. exported more than 1,000 primates annually to France between 1978 and 1980, most of which were macaques.

Officially recorded British exports to France were 1,101 in 1980 and 1,062 in 1981, most of which were macaques (Table 20). Indonesian, Malaysian and Kenyan exports to France appear to be minor (Tables 23, 24, 25 & 30), and no primates have been sent to France from the Philippines since 1971 (Tables 27 & 28). Thailand sent approximately 200 macaques per year to France between 1972 and 1975 (Eudey, 1978).

Given France's laboratory requirements, including terminal uses (Spiegel, 1978; 1979), the fact that it imported 2,592 primates from the U.S.A. and U.K. alone in 1980, and given its close economic links with habitat countries among its former colonial possessions in Africa, it is reasonable to estimate French imports as being at least 4,000 per year for research.

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[3] The green monkey *(Cercopithecus aethiops)* is divided into several distinct races, of which the vervet *(C. a pygerythrus)* and the callitrix *(C. a. sabaeus)* are the best known.

Four endangered golden-headed lion tamarins (*Leontopithecus chrysomelas*) were imported into France in 1983, and are on exhibit in the privately-owned Zoo de la Palmyre (Anon., 1984). Monkeys are freely available in the pet shops of Paris at the time of writing (pers. obs.).

West Germany. More than 2,000 primates were imported by West Germany during 1979 (Tables 3 & 5). The West German 1980 CITES report notes imports of 745 primates, a drop of nearly 60% in self-reported imports in just one year. Although West Germany was the third largest user of laboratory primates in the 1970's, a relatively low proportion of the work was terminal, resulting in an annual requirement of about 2,400 animals in 1977 (Caldecott & Kavanagh, this volume). This approximately matches the known imports for the late 1970's. Today, West Germany is not a major importer from Indonesia, the Philippines, the U.K. or the U.S.A. (Mack & Eudey, this volume; Tables 20, 23, 24, 27 & 28), although Malaysia exported 491 macaques there in 1979 (Table 25) and Kenya sent more than 500 green monkeys and baboons (*Papio* spp.) in 1980 (Table 30).

Greece. "992 primates of various species" have been imported by Greece from Belgium, France, the U.K., Malaysia, the Philippines, Ghana and Nigeria since 1974 (Greek Ministry of Agriculture figures, 1982). This figure is consistent with information from the exporting countries (Tables 20, 23, 24 & 25).

Italy. Italy reported the importation of 1,900 primates during 1980 (Table 6), and a similar number has been estimated for 1979 (Table 5). Most of the imports are squirrel monkeys (*Saimiri sciureus*), macaques and green monkeys, although the 1980 report included a surprising number of rare Appendix I species from Brazil. However, more recent information indicates that although permission was sought, the animals were not actually imported (Italian Nature Protection Division information, 1982).

Italy is an important customer for British, Indonesian, Malaysian, Philippine, Kenyan and American monkeys (Mack & Eudey, this volume; Tables 20, 23, 24, 25, 28 & 30), and Thailand regularly exported small numbers of macaques to Italy prior to 1975 (Eudey, 1978).

The Netherlands. Between 1977 and 1981, an average of 4,125 primates were imported per year, mainly from Indonesia (macaques) and Kenya (green monkeys and baboons) (Table 7). Most of these animals were re-exported by the dealers to "medical institutes" in Belgium, France, Sweden and the U.S.S.R. (C.J. Kalden, pers. comm., 1982). It appears as if very few imported animals are used domestically since the Netherlands captive-breeds primates for most of its research requirements (Caldecott & Kavanagh, this volume).

The United Kingdom. The earliest set of statistics that is available for the U.K. covers the period 1965 to 1975 (Table 8). However, the data for the first three years are almost certainly an exaggeration as they are based upon licenses issued with no reference to whether or not these were actually used (Burton, 1978; R.E. Hackett, pers. comm., 1982.) The annual average of 11,797 for the years 1968 to 1975 is probably more realistic. There was a considerable drop in imports in 1975 when stringent health regulations came into effect (Kavanagh, 1982; 1983), subjecting imported primates to strict quarantine procedures. The pet trade appears to have declined dramatically during this period and has effectively been non-existent since 1974 (see Kavanagh, *loc. cit.)*.

There are two sets of more recent statistics that are provided by the British Government. Firstly, the Department of the Environment (DoE) (the CITES management authority) produces annual CITES reports. Secondly, the Ministry of Agriculture, Fisheries and Food (MAFF) keeps records of the total numbers of imported primates subjected to quarantine controls. The two sets of figures provide rather different results (Table 9), with the MAFF's totals being generally higher than those of the DoE. For reasons that have been explained in detail elsewhere (Kavanagh, 1982; 1983), the MAFF's figures are more accurate.

Table 10 summarizes the best available estimates for total U.K. primate imports in recent years. The numbers show a steady decline until 1979, at which point they appear to have stabilized at a little over 6,000 per year.

Most of the primate imports are Old World monkeys (Cercopithecidae), with *Papio* and *Macaca* being the genera most often imported for research (Tables 11 & 12). A few hundred animals per year are also imported for zoos from a variety of countries (Table 13).

The U.K. is a regular exporter of several hundred primates per year (Table 18 & 20); most are destined for other European countries.

B. Western Europe Outside the E.E.C.

Austria. Both Indonesia and Kenya export small numbers of monkeys to Austria (Tables 23 & 30), but overall levels of imports appear to be low (Table 5). Austria only joined CITES in April, 1982 and before that the trade was unregulated (Kavanaugh & Bennett, this volume). The 1979 figure of 91 imports may therefore, be an underestimate.

Spain. Spain is a regular importer of relatively few live primates (Tables 5, 20, 21, 23, 24, 29 & 35), although a lack of any information from Spain itself suggest that the 1979 figure of 219 may be an underestimate (Table 5).

Sweden. Sweden is a major importer of live primates: 3,227 were imported in 1979 (Table 5). Macaques are obtained from the U.K. and Indonesia (Tables 20, 23 & 24), and Malaysia and the Philippines were additional sources in the past. (Tables 25 & 27).

Switzerland. Tables 5 & 14 show that Switzerland consistently imports about 200 monkeys per year, mostly for biomedical research. Common marmosets (*Callithrix jacchus*), squirrel monkeys and macaques account for the vast majority of recent imports. Countries that export to Switzerland include the U.K., Malaysia and the Philippines (Tables 20, 25 & 28). Switzerland also exports a small number of live primates (Table 3).

C. Eastern Europe

It has proved very difficult to get direct information from Eastern European countries, so what follows is particularly likely to underestimate the trade.

Hungary. Kenya exported small numbers of green monkeys to Hungary in 1979 and 1980 (Table 30).

Poland. Both the U.K. and Kenya have exported small numbers of live primates to Poland in recent years (Tables 21 & 30). The 1979 import total of 305 (Table 5) makes Poland a bigger importer than, for example, Denmark or Switzerland.

Romania. No trade in live primates to Romania was recorded in 1979 (Tables 5 & 18), but Malaysia exported 150 macaques to Romania in 1980 and small numbers during the mid-1970's.

The Union of Soviet Socialist Republics. Although the U.S.S.R. reports hardly any imports of live primates in their 1979 CITES report (Table 3), there is evidence of a regular trade in macaques from Indonesia and Malaysia (Tables 23, 24 & 25; C.L. Darsono, pers. comm., 1981). East Africa would appear to have been another important source of primates with Kenya exporting 1,785 green monkeys to the U.S.S.R. between June, 1978 and May, 1979 (C. Boydell, pers. comm., 1980) and another 1,321 in 1980 (Table 30). Ethiopia is also an important source. The U.S.S.R. ordered 750 hamadryas baboons *(Papio hamadryas)* and 2,070 green monkeys from Ethiopia via a Dutch company in 1981 (confidential source, 1981). In addition, the U.S.A. exported 60 moustached tamarins (*Saguinus mystax*) to the U.S.S.R. during the period 1979-1980 (Mack & Eudey, this volume).

The available information suggests minimum Russian imports of 1,147 in 1979 (Table 5), 2,561 in 1980 (Mack & Eudey, this volume; Tables 24, 25 & 30) and 1,060 in 1981 (Tables 24 & 25), plus those animals that were imported via the Netherlands (see above). However, B. Lapin (1978, quoted by A.N. Rowan, pers. comm., 1982) estimated that the U.S.S.R.'s total demand was approximately 10,500 to 12,000 per year in the late 1970's and projected to double by the late 1980's. About 50-60% of the demand was planned to be met by imports. Thus imports would rise to about 12,000 per year by the late 1980's. It seems likely that current imports are very much greater than the 1979 and 1980 figures would suggest and that the U.S.S.R. is already one of the world's largest primate importers.

Yugoslavia. Malaysia has regularly supplied macaques to Yugoslavia since at least 1974 (Table 25), and Indonesia supplied several hundred in 1980-1981 (Table 24). Kenya is also a supplier, mostly of green monkeys (Table 30). These three countries exported to Yugoslavia at least 640 live primates in 1978, 350 in 1979, 1,060 in 1980 and 700 in 1981, making Yugoslavia second only to the U.S.S.R. in Eastern European primate imports. Since this is based on exports from just three countries, it seems particularly likely to be an underestimate.

D. Asia

Bangladesh. In 1977, an American company signed a contract with the government of Bangladesh to export 90,000 rhesus monkeys over a ten-year period. However, following criticism of the company's fulfillment of its conservation obligations under the contract, the agreement was cancelled during 1979 by the government of Bangladesh and became a matter of dispute between the two parties, with the company being supported by the U.S. government (Long, 1982).

No export figures are available from Bangladesh, but it was a regular exporter of a few hundred monkeys per year in the late 1970's. Exports have declined sharply since then (Tables 18 & 19).

China. Reported exports of live primates from China were less than 100 per year prior to 1981, although at least 131 were exported in that year (Tables 18 & 19).

India. Although India was formerly the world's leading exporter of live primates, the trade effectively ceased in 1978 following its ban on primate exports (Table 19, and see Kavanagh & Bennett, this volume). The U.S. alone imported up to 200,000 rhesus monkeys annually from India in the late-1950's, and a total of 332,000 Indian primates between 1966 and 1978 (Mack & Eudey, this volume).

Indonesia. In recent years, Indonesia has taken over as the biggest exporter of live primates in the world, (Tables 18, 19, 23 & 24), totalling over 12,000 long-tailed macaques annually between 1979 and 1981 (Table 24). Almost all of the exports are long-tailed and pig-tailed macaques (*Macaca fascicularis* and *M. nemestrina*) for laboratory research, although small numbers of other Indonesian species (including some that are listed on CITES Appendix I) are also traded (Table 22).

There are discrepancies between the sets of export data that are available for 1978 (Tables 22 and 23) and 1979 (Tables 23 & 24) but these cannot be resolved on the basis of available information.

Israel. Although Table 5 shows imports of only 33 live primates to Israel during 1979, there is a regular import trade of about 300 per year for research purposes (E. Benhar, pers. comm., 1982).

Japan. Although Japan did not join CITES until 1980, official government statistics are available for the period 1970 to 1981 (Table 15). No comprehensive, independent check on these figures is possible and some discrepancies can be found: for example, between the Japanese figures for primates imported from Indonesia, Malaysia and the Philippines and available data on exports from those countries to Japan (Tables 23, 24, 25, 27 & 28). However, these differences are not big enough to suggest that the overall picture presented in Table 15 is incorrect.

Imports peaked at over 20,000 per year in the early 1970's and have since declined to about 40% of that rate. Particularly large numbers of Indonesian primates were imported by Japan in 1972 and 1973. Indonesia is still a major supplier to Japan, although Bolivia has achieved almost equal importance since 1980, having been a regular supplier since 1973. Of the other Asian countries, Malaysia has been an important supplier since at least 1970, although Japanese imports from there dropped sharply in 1980 (see also Table 25).

No African country has been a major supplier to Japan (in terms of numbers) throughout the 1970's. Brazil and Peru were important New World exporters during the early 1970's, but with the advent of export bans in those countries (Kavanagh & Bennett, this volume), Bolivia became the major New World supplier. Colombia provided primates to Japan until 1976 in spite of a complete ban on exports in the country from 1974 (Kavanagh & Bennett, this volume).

Europe, Canada and the U.S.A. have provided only small numbers of primates to Japan since the early 1970's. However, a detailed analysis of Japanese imports of apes reveals that several European countries have been conduits for chimpanzees (*Pan troglodytes*) and gorillas (*Gorilla gorilla*) that were bound for Japan; many of them were taken illegally from their countries of origin (Nishida & Uehara, 1982). Chimpanzees from Sierra Leone have been imported by Japan, via Belgium, as recently as 1980. In 1979 and 1980, two gorillas were shipped from Austria (then not a member of CITES) to Japan. Nishida & Uehara (1982) conclude that during the period 1979 to 1980, Japan probably imported 96 chimpanzees, 12 gorillas and 95 gibbons altogether. Details of other primate species imported are not available.

Malaysia. Malaysia has some of the best documented figures for the live primate trade (Laursen, 1978; Nordin, 1981; Nordin & Hasnah Samian, 1981). Primates are exported only from Peninsular Malaysia, (see Kavanagh & Bennett, this volume) and consist mainly of long-tailed macaques (Nordin & Hasnah Samian, 1981). It is likely that the 1979 government trade figures for *M. fascicularis* and *M. nemestrina* were reversed as the nearly 4,000 pigtail macaques exported would mean a dramatic but temporary change in trade patterns for which there is no other evidence.

During the period 1974-1977, average annual exports were approximately 10,000. A sharp increase in exports occurred in 1978-1979 (Table 25) as monkeys became harder to obtain elsewhere (especially India). Since mid-1979, the trade has been strictly regulated under a 1978 amendment to the federal wildlife laws and appears to have stablized at approximately 3,000 animals per year (Tables 25 & 26). However, the Malaysian government plans to ban the commercial export of all primates during 1984 (Anon., 1983).

Pakistan. It is unlikely that 225 primates (including 150 rhesus monkeys) were exported by Pakistan during 1979 (Table 18). They were reported as imports in the U.S. CITES Report (Table 3) and yet they do not appear in Mack & Eudey's (this volume) lists of 1979 American imports based on more accurate information. Furthermore, all primates are protected in Pakistan and their export forbidden (National Council for Conservation of Wildlife in Pakistan information, 1982). Table 19 tends to confirm that Pakistan has not exported primates in recent years.

The Philippines. Consisting entirely of long-tailed macaques, exports of live primates from the Philippines have been important throughout the 1970's (Table 27) and have risen sharply since the Indian export ban of 1978 (Tables 19 & 28). Over the period 1978 to 1981, known Philippine exports were second only to those of Indonesia and totalled over 5,000 annually.

Singapore. Singapore was an important source of gibbons and other Southeast Asian primates during the early 1970's (Mack & Eudey, this volume; see also Table 15). With the exception of long-tailed macaques, none of these animals could have originated in Singapore (Kavanagh & Bennett, this volume). The Republic's significance is as a commercial center involving imports and re-exports. Although some exports have been recorded since 1972 (see Tables 15 & 19 and Mack & Eudey, this volume), imports of a few hundred animals per year are still taking place (Tables 5, 20, 21, 24, 25, 28 & 30). The ultimate destination or local use of these primates is not known.

Taiwan. During the early 1970's, Taiwan exported a few hundred primates per year (Mack & Eudey, this volume; Table 15). Its more recent significance is as a major importer (Table 5), particularly of long-tailed macaques from Southeast Asia (Tables 23, 24, 25, 27 & 28). It also imported common marmosets from the U.K. (Table 20), baboons from Kenya (Table 30) and an orang-utan from Canada (Table 34). Nearly 6,000 imports were recorded for 1979 on the basis of other countries' export data. The lack of Taiwanese import data and export data from such likely exporters as Belgium, the Netherlands, Ethiopia, and Somalia means that actual import figures may have been much higher.

E. Australasia

Australia. During the period 1975-1979, Australia reported annual imports averaging 261 primates, most of which were destined for research purposes (Table 16). The accumulated information in Table 5, however, gives import figures of 581 versus the Australia figure of 221 for that year. The lack of details in Table 16 does not permit the resolution of this discrepancy, but the higher figure includes an Indonesian report of 300 macaques bound for Australia (Table 24). Malasyia reports average exports to Australia of 285 per year during the period 1975-1979, and these figures show that more were exported in 1975 and 1977 than were recorded as imported by Australia (Tables 16 & 25). Whatever the reasons for these discrepancies, all figures indicate that Australia imports only a few hundred research primates per year, plus occasional zoo and circus animals from such countries as the U.K., Canada and the U.S.A. (Tables 20, 21 & 34; Mack & Eudey, this volume).

F. Africa

Botswana. The significance of Botswana as an exporter lies not in the numbers of animals traded (Table 18), but in its being one of the few sources of bushbabies (*Galago* spp.) (Table 3). Botswana has occasionally exported small numbers of primates to the U.K., Japan and the U.S.A. (Tables 9, 13 & 15; Mack & Eudey, this volume).

Chad. In recent years, the U.K. has regularly imported a few patas monkeys (*Erythrocebus patas*) from Chad annually, including 125 during 1980 (Tables 9 & 12). Between 1972 & 1975, the U.S.A. imported 102 primates from Chad (Mack & Eudey, this volume).

Ethiopia. Ethiopia has been one of the top two exporters of African primates since 1978 (Table 19), supplying the U.K. and Japan on a regular basis (Tables 9 & 15). It is a particularly important source of olive and hamadryas baboons (*Papio anubis* and *P. hamadryas*).

Ethiopian exports to the U.S.A. have declined, from 3,400 to 5,600 per year in the 1960's to 200 per year in 1980-1981 (Mack, 1982; Mack & Eudey, this volume). This probably reflects the deteriorating relationship between the two countries. In recent years, Ethiopia has become an important source of primates for the U.S.S.R. (C.E. Morris, pers. comm., 1981). Species included in this trade are baboons and green monkeys. Because data on exports to the U.S.S.R. are not available, the figure of 1,848 monkeys exported in 1979 (Table 18) is certainly an underestimate.

Kenya. Data of Kenyan origin suggest annual exports averaging 4,600 primates over the two years 1979-1980, of which most were green monkeys and the remainder baboons (Table 30). However, combined information from a variety of sources indicates that Kenya is one of the top three or four primate exporters in the world, with annual totals of up to 10,000 animals (Tables 18 & 19). Kenya supplies a wide variety of countries with live primates (Table 30), including thousands per annum to the Netherlands and the U.S.A. (Table 7; Mack, 1982; Mack & Eudey, this volume). Lower numbers, principally of baboons and green monkeys, have been supplied to the U.K., Italy, Japan and Canada in recent years (Tables 6, 9, 11, 12, 13, 15 & 17).

Senegal. Prior to 1980, Senegal exported small numbers of primates to the U.S.A. (until 1975) and to the U.K. (Table 9; Mack & Eudey, this volume). Olive baboons (*Papio anubis*), Guinea baboons (*Papio papio*) and patas monkeys (*Erythrocebus patas*) were the major species involved (Tables 11 & 12). British figures record the importation of 1,411 baboons from Senegal during 1980 (Table 11), a considerable increase over previous years. However, Senegalese wildlife authorities report exports of only 240 primates in 1980 (Table 31). These figures almost match imports reported by Shamrock Farms in the U.K. (Table 12), but more than 1,000 baboons remain an unexplained discrepancy between the Senegalese and British figures. Senegal's exports of live primates may have been underestimated in Tables 18 & 19, given its close economic links with France, the availability of Senegalese primates for legal export and the possibility of incomplete documentation of the trade in both countries (see Kavanagh & Bennett, this volume).

Sierra Leone. The significance of Sierra Leone as an exporter of live primates does not lie in the numbers involved but in the species exported, namely chimpanzees. An annual average of 249 animals were exported to the U.S.A. between 1964 and 1976 (Mack & Eudey, this volume). Japan imported less than 100 primates per year from Sierra Leone between 1970 and 1981 (Table 15) and the U.K. imported a total of 26 animals between 1976 and 1979 (Tables 9, 12 & 13). This trade is significant because prior to the introduction of an export ban in 1978, large numbers of chimpanzees (*Pan troglodytes*) were legally exported; and since then, a smaller, illegal export trade in chimpanzees has continued (Nishida & Uehara, 1982; Teleki & Baldwin, 1979).

Somalia. Almost all of the live primate exports by Somalia that have been traced went to the U.S.A., which received an average of 1,194 per year during the 1970's (Mack & Eudey, this volume). It is almost entirely on the basis of these American imports that Somalia ranks as the ninth biggest exporter on Tables 18 & 19, since the other major importers that provide data do not import Somali monkeys, apart from two animals imported by Japan during 1981 (Table 15). Almost all of Somalia's exports are green monkeys (Mack & Eudey, this volume).

South Africa. Although it is a habitat country, South Africa's importance is as an importer and not as an exporter (Tables 5, 18 & 19). It declared imports of 600 squirrel monkeys (*Saimiri sciureus*) from South America during 1979 (Table 3) and 1,046 squirrel monkeys from Bolivia during 1980 (South African CITES report). A confidential source (1982) who monitored traffic at Cape Town airport on a part-time basis estimated that he saw consignments of imported squirrel monkeys totalling some 1,500 to 1,800 animals between June, 1980 and February, 1981. All were from Bolivia and were declared to be captive-bred, but inquiries revealed that there was no captive breeding station in Bolivia. By the end of 1981, all primate imports to South Africa were banned by the provincial administrations (Anon., 1981).

South Africa also has a large internal trade in chacma baboons (*Papio ursinus*) and vervets (*Cercopithecus aethiops pygerythrus*) for laboratory use, and thousands of baboons are killed annually as agricultural pests (see Caldecott & Kavanagh, this volume).

Tanzania. During the period 1964 through 1973, Tanzania was a regular exporter of live primates to the U.S.A. at an annual average of 899 animals (Mack & Eudey, this volume). Since then, there were no records of Tanzanian exports until 1977, when 5 primates were imported by Japan (Table 15). The Tanzanian Game Division reported exports of four red colobus monkeys (*Colobus badius tephrosceles*) to Japan for scientific purposes in 1980, but as this species has never been kept for long in captivity, it seems unlikely that they were live animals (B.A. Kamara, pers. comm., 1982). Official Tanzanian export figures for 1980 and 1981 total 74 animals (B.A. Kamara, pers. comm., 1982), although Mack (1982) indicates that the U.S.A. resumed imports from Tanzania in 1981 with 201 animals. In addition, two bushbabies *(Galago* sp.*)* were sent to the U.K. during 1981 (Table 13; B.A. Kamara, pers. comm., 1982). Consequently, in recent years, Tanzania has been an intermittent exporter of small numbers of live primates.

Togo. No exports from Togo appear in Tables 18 or 19, but official Italian figures for 1980 (Table 6) record the importation of 206 live primates from Togo. Twelve species were involved, including a chimpanzee, but it should be noted that the Italian information may be based on license applications and thus these exports may not have occurred (see 'Italy' above).

G. North America

Canada. Canadian data on live primate imports indicate than an annual average of 3,105, mostly unidentified animals, were imported during the period 1978 to 1980 (Table 17). American sources show that the majority of these animals were macaques, and to a lesser extent green monkeys, from the U.S.A. (Mack & Eudey, this volume). Canada is a major importer (Table 5), but brings in only relatively small numbers of animals from countries other than the U.S.A. (Table 17; see also Table 20, 29 & 30).

Canada is also a regular exporter of primates to many countries. This trade involves only small numbers of animals but consists of many species (Table 34). Once again, the majority of this trade is with the U.S.A. (but see also Tables 9, 13 & 15).

The United States of America. The U.S.A. is the biggest importer of primates in the world (Table 5) and a major exporter as well (Tables 18 & 19). For details of this trade see Mack (1982) and Mack & Eudey (this volume).

H. South and Central America and the Caribbean

Barbados. Total exports of live primates number about 300 annually, comprised entirely of feral African green monkeys living on the island (J. Baulu, pers. comm., 1981; Mack, 1982).

Bolivia. Tables 18 & 19 show Bolivia to be the most important source of Neotropical monkeys and one of the biggest exporters of live primates in the world. Data from both Japan and the U.S.A. suggest that it was only during the mid-1970's that Bolivia became important in the primate trade, and that this followed the imposition of the Peruvian and Colombian export bans in 1973 and 1974, respectively (Table 15; Kavanagh & Bennett, this volume; Mack & Eudey, this volume). The most recently available information shows that exports of at least twelve primate species are continuing (Table 33; see also Tables 6, 9, 11, 12, 13 & 15). Mack (1982) reports that the U.S.A. imported 5,728 primates from Bolivia during 1981. .

Bolivia is certainly the premier source of wild caught squirrel monkeys (Table 6; Mack & Eudey, this volume; see also "South Africa" above). In addition, the poorly regulated nature of the trade has made Bolivia an outlet for smuggled Brazilian primates (see Kavanagh & Bennett, this volume).

Brazil. While Brazil has had a ban on trade in primates since 1967, many animals are still smuggled across the border for re-export by neighboring countries. Bolivia and Paraguay exported large volumes of common marmosets (*Callithrix jacchus*) to the U.S. during the 1970's, even though this species is found only in Brazil (Mack & Eudey, this volume). At least 29 golden-headed lion tamarins *(Leontopithecus chrysomelas)*, a species endemic to Brazil, were imported by Belgium via Bolivia in 1983 (Anon., 1984). In addition, many primate species are sold as pets in Brazil (J.M. Ayres, pers. comm., 1982; R. Mittermeier, pers. comm., 1983).

Colombia. Formerly one of the biggest sources of monkeys in the New World, Colombia virtually stopped exporting live primates in 1974, following its primate trade ban (Mack & Eudey, this volume). Since then, only small numbers have been exported (Tables 5, 9, 15 & 17). Reports from Colombia suggest that all exports between 1975 and 1980 were illegal (Kavanagh & Bennett, this volume). The U.S.A. imported 92 primates from Colombia during 1981 (Mack, 1982).

Guyana. There was a brief upsurge in Guyanan exports to the U.S.A. during 1974 and 1975, coinciding with the introduction of the Colombian export ban (Kavanagh & Bennett, this volume; Mack & Eudey, this volume). Before and since then, Guyana has been a regular exporter of a few hundred primates per year (Tables 9, 12, 13, 15, 17, 18 & 19; Mack & Eudey, this volume). 1980 seems to have been a peak year, with 1,558 animals going to the U.K. and the U.S.A. alone (Table 11; Mack & Eudey, this volume). Guyana is a major source of squirrel monkeys.

Honduras. Honduras is not a regular exporter of live primates and the 150 animals reported for 1979 (Table 18) are quite conspicuous. The U.S.A. reported this import figure in their 1979 CITES tabulation (Table 3), where they are not identified by species. It is likely that these primates were never exported from Honduras as they do not appear in the figures provided in Mack and Eudey's (this volume) analysis from official U.S. import documents during 1979.

Panama. During the mid-1970's, Panama was a regular source of live primates, particularly for the U.S.A., but this trade ceased in 1979 following a ban on primate exports (Tables 9, 13, 15, 18 & 19; Mack & Eudey, this volume). Until at least 1976, Panama provided an outlet for monkeys smuggled from other countries (J. Walsh, pers. comm., 1976), including endangered cotton-top tamarins from Colombia.

Paraguay. Paraguay is a regular exporter of a few hundred monkeys per year, although exports to the U.S.A. topped one thousand per year between 1974 and 1976 (Tables 9, 11, 13, 15, 18 & 19; Mack & Eudey, this volume). Exports may well have ceased altogether by the end of 1981 (Tables 13, 15 & 19; Mack, 1982).

Peru. Until 1974, Peru was the biggest single source of New

World primates. The U.S. alone imported over 360,000 primates from Peru between 1964 and 1973 (Mack & Eudey, this volume). Exports declined sharply following Peru's 1973 trade ban and ceased entirely apart from a very few animals that were received by Japan (Table 15; see also Kavanagh & Bennett, this volume). Exports began again in the mid-1970's through the Peruvian Primate Project, but on a much smaller scale than in the past. Under this project, about 500 animals per year are exported solely to the U.S. National Institutes of Health, although some of these animals are then re-exported to scientific users in other countries (Mack & Eudey, this volume; M. Moro, pers. comm., 1982; P. Soini, pers. comm., 1980).

IV. Live Primates: Species in the Trade

A. Major Traded Species

The vast majority of primates currently traded are Old World monkeys. Mack & Eudey (this volume) provide figures from which we may estimate that 80% of U.S. imports during the period 1976 to 1980 were primates of the family Cercopithecidae. No similar figures are available for any other major importing country, but 77% of identified primates that were recorded in CITES worldwide trade records for 1979 were cercopithecids (Table 36).

In the late 1960's and early 1970's, trade in cercopithecids was not as important as it is now. For example, they made up only 37% of U.S. imports during the period 1968 to 1972. This was a result of the high demand for New World monkeys by the pet trade (Mack & Eudey, this volume). However, cercopithecids appear to have made up more than 80% of British imports during the same period (Table 8). Throughout the period 1965 to 1975, cercopithecids showed a rise from 74% to 92% of total British imports (Table 8).

The four genera *Macaca*, *Cercopithecus*, *Papio* and *Erythrocebus* make up almost all the cercopithecids in trade, with *Macaca* being by far the most important (Table 37; Mack & Eudey, this volume). Rhesus monkeys have declined greatly in the trade in recent years because of the Indian export ban (Held, 1982) and, as a result, long-tailed macaques now account for about half of the total worldwide primate trade. Indonesia, the Philippines and Malaysia export mainly long-tailed macaques, and together account for 54% of the exports in Table 19.

The second most important family in the primate trade is the Cebidae, largely due to the considerable laboratory trade in South American squirrel monkeys *(Saimiri sciureus)*. The only other cebid genera that have been traded in significant numbers in recent years are night monkeys (*Aotus* spp.) and capuchins (*Cebus* spp.) (Table 37; Mack & Eudey, this volume). Trade in cebids and in members of the third most traded family, the Callitrichidae, was cut drastically when the U.S.A. banned the importation of primates for the pet trade in 1975 (Anon., 1974; Mack & Eudey, this volume). There was also a steady decline in British imports of these two South American families, both in absolute numbers and in their percentage of the market, between 1965 and 1975 (Table 8). Callitrichids comprised 10% of the CITES-recorded worldwide trade in 1979 (Table 36). *Saguinus* and *Callithrix* were the most traded genera of the family, both in CITES worldwide figures for 1979 (Table 37) and amongst U.S. imports since 1968 (Mack & Eudey, this volume). According to the latter figures, *Saguinus labiatus* and *S. mystax* together accounted for nearly 5% of total U.S. primate imports between 1976 and 1980.

The remaining primate families account for only a small percentage of the trade.

B. Endangered and Vulnerable Species in Trade

In this section, I review very briefly the trade in those species that are listed as *endangered*, *vulnerable*, *rare* or *indeterminate* in the IUCN Mammal Red Data Books (IUCN, 1978; 1982; in prep.). In keeping with the style of the Red Data Books, *threatened* is used as a general term for species in these categories and it should not be thought of in this context as necessarily indicating that they are listed in Appendix I of CITES, even though there is a great deal of overlap. See Kavanagh and Bennett (this volume) for the list of primate species that are placed in Appendix I; all others are in CITES Appendix II.

Lemuridae, Cheirogaleidae and Lepilemuridae. Members of these families are found only in Madagascar, except for two species of *Lemur* that also occur on the Comoro Islands. Both countries restrict exports to a few per year, at most, and then only for special purposes, such as zoo breeding. Fourteen taxa (species and subspecies) in these families are listed in the Red Data Book (IUCN, 1978) and all members of the family are on Appendix I of CITES. None is traded in large numbers (e.g. Table 3); the majority of those that are traded appear to originate from breeding colonies in Europe or North America, and there is no evidence to suggest that they are traded for purely commercial purposes or used in laboratory research.

Indriidae and Daubentoniidae. All species in these familes are endemic to Madagascar and are afforded the same protection from trade as are the lemurids. *Daubentonia* and four indriid taxa are listed in the Red Data Book (IUCN, 1978) and all members of both families are in Appendix I of CITES. None has appeared in trade statistics since 1972 when the U.S.A. imported 11 *Propithecus verreauxi* (Mack & Eudey, this volume).

Lorisidae. No lorisids are listed in the Red Data Book (IUCN, 1978) and all are included in Appendix II of CITES.

Tarsiidae. Three members of this family are listed in the Red Data Book (IUCN, 1978).[4] They are the Bornean tarsier (*Tarsius bancanus borneanus*), the Sulawesi tarsier (*T. spectrum*) and the Philippine tarsier (*T. syrichta*). The first two are of indeterminate status and the third is endangered. All Tarsiidae are listed in Appendix I of CITES.

J.B. Alvarez (pers. comm., 1977) reports that *T. syrichta* is being depleted by capture for exportation, but it does not appear in any of the trade information that has been collected for this volume. Burton (1978), however, reports that licenses were issued for the import of 10 animals to the U.K. between 1965 and 1975. These licenses were not used, nor were other licenses that were issued for the importation of *T. bancanus* (50) and *T. spectrum* (4).

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[4] The Sulawesi tarsier (*Tarsius spectrum*), which was listed in the 1978 Red Data Book, has since been delisted owing to evidence that it is more common than previously believed.

Callitrichidae (including Callimiconidae). Twelve species of this family are listed in the Red Data Book (IUCN, 1982). They are the buffy-headed marmoset (*Callithrix flaviceps*), the white marmoset (*C. argentata leucippe*), the buffy-tufted-ear marmoset (*C. aurita*), the tassel-ear or Santarem marmoset (*C. humeralifer*), the cotton-top tamarin (*Saguinus oedipus*), the pied tamarin (*S. bicolor*), the emperor tamarin (*S. imperator*), the white-footed tamarin (*S. leucopus*), the three lion tamarins (*Leontopithecus* spp.) and Goeldi's monkey *(Callimico goeldii)*. All are in Appendix I of CITES except for *C. argentata*, *C. humeralifer* and *S. imperator*.

Since trade statistics often contain entries for "marmosets" or "tamarins" and many primates are smuggled across borders in South America before they are sold on the open market, it is possible that any of the threatened callitrichids may be traded. *S. oedipus* has played a major role in the primate trade for both pet and research use; it is estimated that between 1960 and 1975 some 30,000 to 40,000 were exported from Colombia where the taxon is endemic (Hernadez-Camacho & Cooper, 1976). Field evidence suggests that this trade has had a serious effect on its status (Neyman, 1978). Mack & Eudey (this volume) report that 13,749 cotton-top tamarins were imported into the U.S.A. between 1968 and 1972 but that only 906 were imported between 1976 and 1980 following its listing on CITES Appendix I and the U.S. Endangered Species Act. Mack (1982) does not report any imports of *S. oedipus* to the U.S.A. during 1981. These figures reflect the general downward trend in the trading of *S. oedipus* following the imposition of protective measures, particularly in Colombia in 1973-1974 (Kavanagh & Bennett, this volume; IUCN, 1982). Some *S. oedipus* continued to be exported to the U.S.A. and Europe via Panama, Bolivia and Paraguay until the mid-1970's, but this trade appears now to have ceased (Mack & Eudey, this volume).

None of the other threatened callitrichids is widely traded, although small numbers of them do appear in the available statistics and the trade could be significant in relation to their conservation status.

In the 1979 CITES statistics (Table 3), 93 *C. argentata* are listed but no mention is made of their subspecific identification. Between 1976 and 1981, Ravensden Zoo Ltd. in the U.K. imported at least 87 *C. argentata* from Bolivia for sale to zoos (B.M.B. Pape, pers. comm., 1982).

Numbers of lion tamarins (*Leontopithecus spp.*) in the wild are so small that any collection from the wild for trade purposes could be disastrous (Coimbra-Filho & Mittermeier, 1977; IUCN, 1982). Brazil has a complete ban on all commercial exports of live primates and the five *L. rosalia* that were imported to the U.S.A. in 1980 are on breeding loan to a conservation breeding project. Proper CITES permits accompanied the shipment (Mack & Eudey, this volume). The recent importation of at least 29 golden-headed lion tamarins (*Leontopithecus chrysomelas*) into Belgium in 1983 (Anon., 1984) represents a significant take from the remaining wild population, of which there may be no more than 1,000 left (R. Mittermeier, pers. comm., 1984).

S. imperator, *C. aurita* and *C. goeldii* have all been traded in small numbers in recent years (Tables 3, 6 & 20; Mack & Eudey, this volume; B.M.B. Pape, pers. comm., 1982), mainly by Bolivia. No other threatened callitrichids have appeared in trade statistics since 1968.

Cebidae. Several of the 15 cebid taxa that are listed in the Red Data Book (IUCN, 1982) appear in recent trade statistics, but none of them is presently traded at a high level. *Lagothrix lagotricha* was imported into the U.S.A. in large numbers for the pet trade prior to legislative changes in 1975, but this is no longer the case (Mack & Eudey, this volume). Significant numbers of *Alouatta palliata* were also imported by the U.S.A. prior to 1972, but again this trade has ceased (Mack & Eudey, this volume).

Cercopithecidae. As in the case of the Cebidae, several threatened cercopithecids (of which there are 18) appear in recent trade statistics, but none in large numbers.

Hylobatidae. *Hylobates klossii*, *H. pileatus*, *H. concolor*, and *H. moloch* are all listed in the Red Data Book (IUCN, 1978) as threatened species, and all members of the family Hylobatidae are listed in Appendix I of CITES. Although there is some international trade in threatened gibbons (Table 3; Mack & Eudey, this volume), the numbers that are involved are relatively small. Nevertheless, Japan may have imported nearly 100 gibbons during 1979-1980 (Nishida & Uehara, 1982), which implies that captures could be at levels that are significant for local populations. Some confirmation of this comes from western Kalimantan in Indonesia, where approximately one baby gibbon per week was being taken downstream from one locality as recently as 1981. The local Bidayuh people preferred to shoot mother gibbons with dependent young over other age-sex classes because of the great value of infants in the pet trade. It is not known whether these gibbons were finally sold locally or overseas. (M. Heppell, pers. comm., 1983).

Pongidae. All of the great apes are listed both in the Red Data Book (IUCN, in prep.) and in Appendix I of CITES. Of the four species, the chimpanzee (*Pan troglodytes*) has been most widely traded for entertainment, zoo display and laboratory research. The biggest market has been for research in the U.S.A., which imported 1,171 *P. troglodytes* between 1968 and 1972 (Mack & Eudey, this volume). The U.K. imported 202 between 1965 and 1972. Most of these were actually brought into the country prior to 1969, after which there was a drastic reduction in British ape imports (Burton, 1978). Imports into the U.S.A. have also dropped dramatically, declining to 78 *P. troglodytes* in the period between 1976 and 1980 and none for 1981 (Mack, 1982; Mack & Eudey, this volume). The reduction in numbers traded has also applied to the zoo imports from the wild. This is reflected in the imports of Ravensden Zoo Ltd., which brought into the U.K. at least 14 chimpanzees from Sierra Leone in 1976 but none since (with the exception of a privately owned pet from Kenya in 1980) (B.M.B. Papé, pers. comm., 1982).

There is, however, no doubt that *P. troglodytes* is still exported from habitat countries, even though the numbers appear to be much reduced. For example, Shamrock Farms in the U.K. imported three from Sierra Leone for research purposes in 1979 (Table 12); West Germany imported three from Cameroon in the same year (Table 3); Italy imported one from Togo in 1980 (Table 6); Uganda exported two to North Korea in 1982 (Table 32); and there is a steady trade in young animals imported into Spain and the Canary Islands for the beach photography trade (Anon., 1982a; B. Templer, pers. comm., 1982). The effects of this trade are exacerbated by the capture technique which commonly consists of shooting the mother to obtain the infant (Teleki & Baldwin, 1979), and it is still significant in terms of the species' conservation. Nishida & Uehara (1982) calculate that Japanese imports during the period 1973 to 1977 could have alone been responsible for eliminating the equivalent of two chimpanzee communities (unit-groups) per year. They also report that it is likely that nearly 100 chimpanzees were imported to Japan during 1979 and 1980. However, chimpanzees do breed in captivity (Eudey & Mack, this volume; Caldecott & Kavanagh, this volume), and in recent years, the majority of CITES-regulated trade has been in animals that have originated in North America and Europe (Table 3).

The pygmy chimpanzee or bonobo (*Pan paniscus*) is a less well-known animal both in the wild and in captivity. Since it requires some expertise to distinguish it from the former species, there is always the possibility that some trade in it is hidden in the statistics of *P. troglodytes*.. This appears to have occurred among Japanese imports, possibly as recently as 1980 (Nishida & Uehara, 1982). However, exports of *P. paniscus* from Zaire, where it is endemic, are thought to be minimal. The only certain exports are those of five animals shipped to the U.S.A. in 1975 for breeding and research purposes with the approval of the Government of Zaire (Goldsmith & Moor-Jankowski, 1978). American plans to conduct research on the species caused a heated controversy regarding this shipment (Anon., 1976).

The number of gorillas (*Gorilla gorilla*) that has been traded in recent years could be significant in relation to local gorilla populations. The U.K. imported 39 during 1965-1975 (Burton, 1978); the U.S.A. imported 26 during 1968-1972 (Mack & Eudey, this volume); and Japan imported at least 17 that were probably wild-caught during a fifteen-month period in 1971-1972 (Nishida & Uehara, 1982). At least four gorillas imported by Japan in 1979 and 1980 were apparently for commercial purposes (Nishida & Uehara, 1982). Imports from habitat countries rarely appear in CITES statistics, although France reported bringing in five from Cameroon in 1979 (Table 3). Animals may still be brought into some countries that are not CITES parties, even if they have been smuggled out of their countries of origin. One such case came to light in Belgium in 1982. Prior to Belgium joining CITES on January 1, 1984, it was quite legal to deal in smuggled gorillas, and there is some evidence that the gorilla in question was part of a regular trade in *G. gorilla gorilla* (the western subspecies) from Africa to Belgium (confidential sources, 1982).

As in the case of *Pan*, the capture of gorillas for the trade routinely involves the deaths of other individuals (Sabater Pi, 1980/81) and gorillas have also been killed for the trophy trade, particularly *G. gorilla beringei* in Rwanda (Harcourt & Curry-Lindahl, 1979).

Throughout most of the twentieth century, orang-utans *(Pongo pygmaeus)* have been extensively traded to supply zoos, laboratories and private collections, with several animals being killed for every one that eventually reaches the market (IUCN, in prep.). Since neither Malaysia nor Indonesia now permits *P. pygmaeus* to be exported, any commercial trade in wild-caught animals from habitat countries is both covert and illegal. All CITES-declared animals traded in 1979 originated from North America or Western Europe and were probably zoo exchanges. However, very few second generation captive-bred orang-utans have been born, so it is uncertain whether the captive population will be able to sustain itself over the long term without some recruitment from the wild (Perry, 1976; see also Mace, 1984).

V. Trade in Dead Primates and their Derivatives

With the exception of primates that are hunted and sold as food (which are not dealt with in this chapter), this trade is much smaller than that in live primates (Table 38 compared with Table 3). It involves mainly a few specimens for scientific purposes, most of which originate in Europe or North America, and a very few other species for the trophy and skin trade. Most trophies are obtained from the savannah species of baboon (*Papio* spp.), especially from southern Africa (Table 38; Mack & Eudey, this volume). However, the much smaller, and illegal trade in gorilla trophies that was mentioned in the previous section is far more likely to be damaging in terms of species conservation.

The skin trade, which mainly involves black-and-white colobus monkeys (*Colobus* spp.), may also be significant in conservation terms. Tens of thousands of these animals were killed for their skins in East Africa in the early 1970's (Mittermeier, 1973; Oates, 1977). This form of exploitation has since become illegal, at least in Kenya (Norris, 1980). The various subspecies of the blue monkey *(Cercopithecus mitis)* have also been exploited for their skins, albeit to a lesser degree than have colobus monkeys; their skins were sold in Kenya and Tanzania in the early 1970's (Mittermeier, 1973) and are still sold in Zaire and Rwanda at the present time (Kavanagh & Bennett, this volume). As the latter sales involve the relatively rare golden subspecies (*C. m. kandti*), they should be of considerable concern. Blue monkey skins were on sale as hand-bags in Fort Portal, Uganda during 1982, but the numbers observed were minimal (L. Leland, pers. comm., 1982).

VI. Summary and Conclusions

The most striking conclusion to emerge from the figures that have been presented is that the international primate trade has greatly diminished in volume in recent years. If worldwide imports of live primates totalled only twice those of the U.S.A. (which are included in the worldwide total), then a minimum of 400,000 primates were being traded annually during the 1950's. The best estimates of imports and exports during 1979 (Tables 5 & 18) coincide at just under 65,000. Since the trade is far better monitored now than it was in the 1950's, it is conservative and therefore reasonable to compare these figures and to conclude that the downward trend is real.

Import statistics from the United Kingdom, Japan and the United States, the only major importers that have trade statistics for more than a decade, show that there was a sharp reduction in trade levels during the mid-1970's (U.K., Table 10; Japan, Table 15; U.S.A., Mack & Eudey, this volume). The period 1979-1981 has seen a levelling out of the curve for the U.K. (Table 10) and for the U.S.A. (Mack, 1982; Mack & Eudey, this volume), but the downward trend continues for the Japanese data (Table 15).

On the basis of this study, the major exporting countries by the end of the 1970's were Indonesia, the Philippines and Malaysia in Asia; Kenya, Ethiopia and Somalia in Africa; Bolivia in South America; and the United States and the Netherlands among the re-exporters. The major importers are the U.S.A., the U.K., Japan, Taiwan and Canada, to which the U.S.S.R. and France should be added on the basis of indirect evidence. The Netherlands is also a major importer, but most of the primates entering this country are rapidly re-exported.

CITES emerges from this study as an important international agreement regulating the trade, but one that is flawed by incomplete implementation. The very fact that Parties to the Convention are obliged to certify and to report on the primate trade has increased the general awareness of its extent and has led to the provision of figures that would not otherwise be available. However, the Convention is only ten years old and has been in operation for less than eight years at the time of this writing (January, 1983). At this time, 59 out of 74 countries are late in submitting their 1981 reports.

The example of Austria, where implementation of the Convention resulted in the almost immediate seizure of a consignment of chimpanzees after years of uncontrolled trade in live primates (Anon., 1982b), shows that CITES can be an effective instrument. However, the example of the Netherlands shows that where there is the desire to do so, the trade can be regulated without membership in CITES, although more data are still needed for a complete picture of the Dutch trade. On the other hand, the example of Bolivia shows that membership alone is not enough and that some countries have difficulties in meeting their obligations under the Convention.

Mortality rates have not been considered in this study, but if Darsono (1979) is anywhere near correct in estimating losses of up to 71% between trap site and end purchaser (for *Macaca fascicularis*), then the drain on wild populations is far greater than the trade figures would suggest, and primates are being wasted as a resource and treated with unnecessary cruelty. Further waste is occurring in countries that kill monkeys as agricultural pests rather than trading them on a sustained yield basis (see Kavanagh & Bennett, this volume).

Where primates have been introduced and have built up successful feral populations, they may be the cause of conservation problems rather than animals in need of protection (e.g., Temple, 1974), but only in Barbados has there been an attempt to utilize a feral population for the trade in a sustained and rational manner (J. Baulu, pers. comm., 1981; Kavanagh & Bennett, this volume).

In conclusion, the overall drop in trade volumes is an encouraging sign. However, a few species remain under threat, either because they are widely trapped for the trade, or because they are already rare, vulnerable or endangered and a small trade threatens them further. The general lack of survey information (Gartlan *et al.*, in prep.) and the recent examples of trade-related threats to species as diverse as chimpanzees and golden-headed lion tamarins show that continued vigilance is essential in order to ensure that the international primate trade does not once again become detrimental to many different populations of primates.

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TABLE 1
LIVE PRIMATE IMPORTS TO THE U.S.A. 1952-1964

Year	Total Imports[1]	Imports for Research[2]
1952	32,000	*
1953	*	*
1954	*	*
1955	151,649	*
1956	*	128,634
1957	*	186,074
1958	223,000	73,511
1959	190,000	102,060
1960	221,000	107,819
1961	126,000	66,358
1962	162,000	53,978
1963	150,000	56,681
1964	115,000	47,905

Notes:

* = no available figures
[1] = figures from the U.S. Customs Department for all primates imported
[2] = figures from the U.S. National Institute of Health on the import of rhesus monkeys and langurs (presumably *Presbytis* spp. for research)

(See also Mack & Eudey, this volume)

Source: Conway (1966)

TABLE 2
ANNUAL REPORTS OF CITES PARTIES

COUNTRY (listed by order of ratification)	1975	1976	1977	1978	1979	1980	1981
1. U.S.A.	o	o	*	*	*	*	o
2. Nigeria	o	o	o	o	o	o	o
3. Switzerland	*	*	*	*	*	*	*
4. Tunisia	o	o	*	*	*	*	*
5. Sweden	*	*	*	*	*	*	*
6. Cyprus	*	*	*	o	o	o	o
7. United Arab Emirates	o	o	o	o	o	o	o
8. Ecuador	o	o	*	o	o	o	o
9. Chile	o	o	*	o	*	o	o
10. Uruguay	o	o	*	*	*	*	o
11. Canada	*	*	*	*	*	*	o
12. Mauritius	o	o	o	*	*	*	*
13. Nepal	o	o	o	*	*	o	o
14. Peru	o	*	*	*	*	o	o
15. Costa Rica	*	*	*	*	o	o	o
16. South Africa	o	*	*	*	*	*	o
17. Brazil	o	o	o	o	*	*	*
18. Madagascar	o	*	*	*	*	*	*
19. Niger	o	o	o	o	o	o	o
20. East Germany	—	*	*	*	*	o	o
21. Morocco	—	o	o	o	o	o	o
22. Ghana	—	o	*	*	*	o	o
23. Papua New Guinea	—	*	*	*	*	*	o
24. West Germany	—	*	*	*	*	*	*
25. Pakistan	—	*	*	*	*	o	o
26. Finland	—	o	*	*	*	*	o
27. India	—	*	*	*	*	*	*
28. Zaire	—	o	o	o	*	o	*
29. Norway	—	*	*	o	*	o	o
30. Australia	—	*	*	*	*	*	o
31. U.K.	—	*	*	*	*	o	o
32. Iran	—	o	*	*	o	o	o
33. U.S.S.R.	—	o	*	*	*	o	o
34. Paraguay	—	—	o	o	o	o	o
35. Seychelles	—	—	o	*	o	o	o
36. Guyana	—	—	o	o	o	o	o
37. Denmark	—	—	o	*	*	o	o
38. Senegal	—	—	*	*	*	*	o
39. Nicaragua	—	—	o	o	*	*	o
40. Gambia	—	—	o	*	*	o	o
41. Malaysia	—	—	—	o	o	*	*
42. Venezuela	—	—	—	o	o	o	o
43. Botswana	—	—	—	*	*	o	o
44. Egypt	—	—	—	o	o	o	o
45. Monaco	—	—	—	o	o	o	o
46. France	* (-)	* (-)	* (-)	*	*	*	*
47. Panama	—	—	—	o	*	o	o
48. Togo	—	—	—	—	o	o	o
49. Kenya	—	—	—	—	o	o	o
50. Jordan	—	—	—	—	o	o	o
51. Indonesia	—	—	—	—	o	*	o
52. Sri Lanka	—	—	—	—	o	o	o
53. Bahamas	—	—	—	—	o	o	o
54. Bolivia	—	—	—	—	o	o	o
55. Italy	—	—	—	* (-)	*	*	o
56. Guatemala	—	—	—	—	—	o	o
57. Tanzania	—	—	—	—	—	o	o
58. Liechtenstein	—	—	—	—	—	o	o
59. Israel	—	—	—	—	—	o	o
60. Japan	—	—	—	—	—	*	o
61. Central African Republic	—	—	—	—	—	o	o
62. Rwanda	—	—	—	—	—	—	o
63. Suriname	—	—	—	—	—	—	o
64. Zambia	—	—	—	—	—	—	o
65. Portugal	—	—	—	—	—	—	o
66. Argentina	—	—	—	—	—	—	*
67. China	—	—	—	—	—	—	*
68. Liberia	—	—	—	—	—	—	*
69. Mozambique	—	—	—	—	—	—	o
70. Zimbabwe	—	—	—	—	—	—	o
71. Cameroon	—	—	—	—	—	—	o
72. Philippines	—	—	—	—	—	—	*
73. Colombia	—	—	—	—	—	—	o
74. Guinea	—	—	—	—	—	—	o
75. Bangladesh	—	—	—	—	—	—	—
76. Austria	—	—	—	—	—	—	—
77. Malawi	—	—	—	—	—	—	—
Total number of parties reporting	6	17	27	30	33	22	15

Key:
— = not a party to the convention
o = party to the convention, but no report submitted
* = annual report submitted

(Reports are due on October 31 of the following year.)

Source: WTMU files, January 1983

TABLE 3
ALL CITES TRANSACTIONS IN LIVE PRIMATES WORLDWIDE IN 1979

Key to Table 3

In this table, reference is made only to species, and subspecies have been ignored. The numbers given represent reported annual totals, not individual shipments.

I = reported by importing country.

E = reported by exporting country.

I/E = matching reports indicate that both countries reported the same animals. However, it is possible that in some instances, each country was reporting different animals, in which case the total number of animals traded is underestimated in this table. Conversely, if the importing and exporting countries have recorded different numbers of animals in their reports of any single transaction, it appears in this table as two entries and thus suggests an overestimate of the total volume of trade.

Source: National CITES reports in WTMU files, June 1982.

SPECIES	NUMBER	IMPORTER	EXPORTER	REPORTED BY
APPENDIX I				
Hapalemur griseus	6	France	Madagascar	I
Lemur spp.	1	France	U.S.A.	E
	1	Japan	U.S.A.	E
L. albifrons	2	U.K.	West Germany	E
	6	Canada	U.S.A.	I
	6	West Germany	Canada	E
L. catta	4	Australia	Canada	I/E
	2	Australia	Switzerland	I/E
	2	East Germany	Switzerland	E
	2	West Germany	Switzerland	E
	2	Italy	West Germany	E
	5	Japan	Canada	E
	3	Japan	West Germany	E
	1	North Korea	Madagascar	E
L. macaco	2	Canada	U.S.A.	E
	4	Canada	U.S.A.	I
	2	West Germany	U.S.A.	E
	4	France	Madagascar	I
	2	U.K.	West Germany	I/E
	2	U.S.A.	West Germany	I/E
	1	East Germany	West Germany	I
	4	Australia	Canada	I/E
	2	West Germany	Canada	E
L. rubriventer	1	U.S.A.	France	E
L. variegatus[1]	2	Australia	U.S.A.	I
	5	West Germany	Switzerland	I/E
	1	North Korea	Madagascar	E
	1	U.S.A.	Switzerland	E
	1	U.S.A.	U.K.	I
Microcebus murinus	2	Australia	Netherlands	I
Callimico goeldii	2	U.S.A.	Bolivia	I
Cebuella pygmaea	50	U.S.A.	Peru	I/E
Saguinus oedipus	1	Netherlands	West Germany	E
Saimiri oerstedii	6	Australia	Belgium	I
	30	West Germany	Italy	E
	1	U.S.A.	Panama	E
Cercocebus galeritus	1	Gabon	France	E
Macaca silenus	1	U.S.A.	Canada	I/E
Nasalis larvatus	2	U.S.A.	Indonesia	I
Hylobates sp.	1	U.S.S.R.	U.K.	I
H. agilis	2	Australia	Indonesia	I
H. concolor	1	West Germany	U.K.	E
H. hoolock	2	Australia	Burma	I
H. klossii	1	Australia	Switzerland	I
	1	U.K.	Switzerland	I/E
H. lar	1	Australia	Hong Kong	I
	1	Australia	Thailand	I
	1	East Germany	West Germany	E
	1	West Germany	Sweden	I/E
	2	South Africa	U.K.	E
H. moloch	1	East Germany	West Germany	I/E
Symphalangus syndactylus[2]	1	Belgium	West Germany	E
	1	West Germany	Belgium	I
	1	West Germany	Switzerland	E
	2	Hong Kong	Indonesia	I
	2	Indonesia	Hong Kong	E
Gorilla gorilla	2	Switzerland	West Germany	I/E
	5	France	Cameroon	I
Pan troglodytes	36	Canada	U.S.A.	I
	1	Switzerland	Spain	I
	7	Ivory Coast	France	E
	1	Colombia	Denmark	E
	2	Cuba	West Germany	E
	1	West Germany	Austria	I
	3	West Germany	Switzerland	E
	3	West Germany	Cameroon	I
	4	West Germany	Denmark	E
	1	West Germany	Sweden	E
	4	Denmark	Switzerland	I
	1	Denmark	Netherlands	I
	2	Denmark	Sweden	I/E
	2	France	U.S.A.	E
	1	Gambia	Spain	I
	2	Indonesia	Switzerland	I/E
	2	Indonesia	Netherlands	I
	9	Japan	U.S.A.	E
	1	U.S.S.R.	East Germany	E
	2	U.S.S.R.	West Germany	E
	1	Thailand	Denmark	E
	39	U.S.A.	Canada	E
	2	U.S.A.	France	I/E
	3	U.S.A.	South Africa	I
	4	Venezuela	U.S.A.	E
	8	Gambia	Netherlands	I
Pongo pygmaeus	2	Australia	Netherlands	I
	1	Canada	U.S.A.	I/E
	1	East Germany	West Germany	I/E
	1	West Germany	Canada	I/E
	1	West Germany	Denmark	E
	1	West Germany	U.S.A.	I/E
	1	West Germany	Switzerland	E
	1	West Germany	Switzerland	I/E
	2	Netherlands	West Germany	E
	1	Poland	West Germany	E
	2	U.S.S.R.	West Germany	I
	1	U.S.S.R.	West Germany	E
APPENDIX II				
Primate spp.	7	Canada	West Germany	I
	45	Canada	Indonesia	I
	71	Canada	Kenya	I
	1	Canada	South Africa	I
	3,328	Canada	U.S.A.	I
	22	Canada	Countries unknown	I
	150	U.S.A.	Honduras	I
	1,440	U.S.A.	Indonesia	I
	100	U.S.A.	Malaysia	I
	12	U.S.A.	Netherlands	I
	75	U.S.A.	Pakistan	I
Galago spp.	34	U.S.A.	Botswana	I
Galago senegalensis	2	Czechoslovakia	U.K.	E
	2	West Germany	U.K.	I
	10	West Germany	Kenya	I
	10	West Germany	U.S.A.	E
	6	U.K.	Botswana	I
	18	U.K.	Botswana	E
	1	Sweden	Finland	E
	6	Sweden	U.K.	I
	24	U.S.A.	Botswana	E
	2	U.S.A.	Kenya	I
Nycticebus coucang	23	U.S.A.	Thailand	I
Otolemur crassicaudatus	4	U.S.A.	Canada	I/E
Callithrix argentata	1	West Germany	Finland	I/E
	1	Poland	U.K.	E
	91	U.S.A.	Bolivia	I
Callithrix jacchus	6	Australia	U.S.A.	I
	80	Canada	U.S.A.	E
	10	Switzerland	West Germany	I
	14	Switzerland	France	I/E
	2	Switzerland	U.K.	I
	12	Switzerland	U.S.A.	I/E
	3	Czechoslovakia	Switzerland	E
	20	West Germany	U.K.	I
	30	France	U.S.A.	E
	12	U.K.	Paraguay	I
	6	Hong Kong	U.K.	I
	3	Japan	U.S.A.	E
	4	U.S.S.R.	U.K.	I
	102	U.S.A.	Belgium	I

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[1] Usually known as *Varecia variegata*.

[2] This genus is now included under *Hylobates* by many specialists and on the latest version of the CITES Appendix.

TABLE 3 (cont.)

SPECIES	NUMBER	IMPORTER	EXPORTER	REPORTED BY
	221	U.S.A.	Paraguay	I
Cebuella pygmaea	2	Netherlands	Sweden	E
	2	Sweden	Netherlands	I
Saguinus spp	8	Canada	U.S.A.	E
	2	U.S.A.	Bolivia	I
Saguinus fuscicollis	36	West Germany	U.S.A.	E
	100	U.S.A.	Peru	I
	130	U.S.A.	Peru	E
Saguinus geoffroyi	1	Colombia	Panama	E
	6	U.S.A.	Panama	I/E
	2	U.S.A.	Panama	E
Saguinus imperator	1	West Germany	Peru	E
	2	U.S.A.	Bolivia	I
Saguinus labiatus	4	Canada	U.S.A.	E
	6	West Germany	Bolivia	I
	663	U.S.A.	Bolivia	I
	30	U.S.A.	Peru	I
Saguinus mystax	20	Japan	U.S.A.	E
	50	U.S.A.	Peru	I
	320	U.S.A.	Peru	E
Aotus trivirgatus[1]	15	West Germany	Bolivia	I
	26	West Germany	Paraguay	I
	183	U.S.A.	Bolivia	I
	1	U.S.A.	Canada	E
	4	U.S.A.	Panama	I/E
Ateles spp.	1	Canada	U.S.A.	I
	1	U.S.A.	Canada	E
Ateles geoffroyi	1	Spain	Nicaragua	E
	2	Guatemala	Nicaragua	E
	2	U.S.A.	Nicaragua	E
Ateles paniscus	1	Denmark	Belgium	I
	1	Denmark	Netherlands	I
Cebus spp.	9	Canada	U.S.A.	I
	1	West Germany	Switzerland	E
	9	U.S.A.	Canada	E
	12	Australia	Belgium	I
	8	Canada	U.S.A.	I
	12	Switzerland	U.S.A.	I
	6	Switzerland	U.S.A.	E
	2	West Germany	Bolivia	I
	2	West Germany	East Germany	E
Cebus apella	2	West Germany	U.K.	I/E
	11	Denmark	U.K.	I
	45	U.K.	Paraguay	I
	7	New Zealand	U.K.	E
	6	Sweden	U.S.A.	I/E
	55	U.S.A.	Bolivia	I
	8	U.S.A.	Canada	E
	43	U.S.A.	Guyana	I
	4	South Africa	U.K.	E
Cebus capucinus	11	Australia	U.S.A.	I
	2	China	Hong Kong	E
	2	El Salvador	Nicaragua	E
Lagothrix lagotricha	1	Switzerland	Czechoslovakia	I
	1	France	Sweden	E
	1	U.K.	Switzerland	E
	12	U.K.	Colombia	I
Saimiri spp.	2	U.S.A.	Bolivia	I
Saimiri sciureus	63	Canada	U.S.A.	E
	40	Switzerland	U.K.	I
	2	Switzerland	South Africa	I
	6	Czechoslovakia	U.K.	E
	45	West Germany	Bolivia	I
	12	West Germany	U.K.	I
	30	West Germany	Italy	I
	30	West Germany	Peru	I
	30	West Germany	U.S.A.	I/E
	5	Denmark	U.K.	I
	60	U.K.	Bolivia	I
	50	Japan	U.S.A.	E
	462	U.S.A.	Bolivia	I
	8	U.S.A.	Guatemala	I
	235	U.S.A.	Guyana	I
	60	U.S.A.	Peru	I
	110	U.S.A.	Peru	E
	600	South Africa	Countries unknown	I
Cercocebus albigena	2	Gabon	France	E
Cercocebus aternmus	2	West Germany	Austria	I
Cercocebus torquates	4	East Germany	Belgium	I
Cercopithecus spp.	4	Canada	U.S.A.	I
	40	Canada	U.S.A.	E
	1	Ivory Coast	France	E
	4	U.S.A.	Canada	E
Cercopithecus aethiops	186	Canada	U.S.A.	E
	20	West Germany	Ethiopia	I
	253	West Germany	Kenya	I
	75	Denmark	Ethiopia	I
	13	Denmark	Sweden	I
	25	France	U.S.A.	E
	61	Sweden	Kenya	I
	1	U.S.S.R.	Netherlands	I
	2	U.S.A.	Barbados	I
	354	U.S.A.	Ethiopia	I
	335	U.S.A.	Kenya	I
	84	U.S.A.	St Kitts	I
	533	U.S.A.	Somalia	I
Cercopithecus diana	2	East Germany	Czechoslovakia	I
	2	East Germany	West Germany	I
	7	Denmark	Sierra Leone	I
	1	Japan	U.K.	E
	2	U.S.A.	Canada	E
Cercopithecus hamlyni	2	U.S.A.	East Germany	E
Cercopithecus neglectus	4	Australia	Spain	I
	1	Canada	U.S.A.	E
	2	West Germany	East Germany	E
	2	Japan	West Germany	E
	1	U.S.A.	Canada	I/E
Cercopithecus nictitans	3	Australia	Japan	I
	3	Canada	U.S.A.	I
	1	West Germany	Switzerland	E
	3	U.S.A.	Canada	E
Cercopithecus petaurista	1	Canada	Ghana	E
	1	Israel	Ghana	E
	4	U.S.A.	Ghana	I/E
Colobus angolensis	3	U.K.	Kenya	I
Colobus polykomos	8	West Germany	Switzerland	I/E
	8	U.S.A.	Kenya	I
Erythrocebus patas	2	Australia	West Germany	I
	2	Spain	Senegal	E
	1	U.K.	Ghana	E
	1	Italy	Ghana	E
	1	Lebanon	Senegal	E
	65	U.S.A.	Nigeria	I
Macaca spp.	1,503	U.S.A.	Malaysia	I
Macaca arctoides	1	Canada	U.S.A.	I
	3	U.S.A.	Bermuda	E
	1	U.S.A.	Canada	E
Macaca assamensis	9	Canada	U.S.A.	E
Macaca fascicularis	110	Australia	Malaysia	I
	49	Australia	U.S.A.	I
	49	Belgium	U.S.A.	E
	1,757	Canada	U.S.A.	E
	13	Switzerland	U.K.	I
	32	Switzerland	Malaysia	I
	4	West Germany	Switzerland	E
	73	West Germany	Indonesia	I
	820	West Germany	Malaysia	I
	178	West Germany	U.S.A.	I
	140	West Germany	U.S.A.	E
	5	Denmark	Switzerland	E
	30	Denmark	Netherlands	I
	40	France	U.K.	E
	888	France	U.S.A.	E
	1,094	U.K.	Indonesia	I
	49	U.K.	U.S.A.	E
	39	U.K.	Mauritius	E
	40	Hong Kong	Malaysia	I
	52	Italy	U.K.	E
	72	Italy	U.S.A.	E
	20	Japan	U.S.A.	E
	60	Mexico	U.K.	E
	150	Sweden	U.K.	I
	153	Sweden	U.K.	E
	1,319	Sweden	Netherlands	I
	1	Sweden	Norway	I
	3,120	U.S.A.	Indonesia	I
	88	U.S.A.	Malaysia	I
	200	U.S.A.	Philippines	I

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[1] The genus *Aotus* has recently been divided into 9 distinct species (Hershkovitz, 1983).

TABLE 3 (cont.)

SPECIES	NUMBER	IMPORTER	EXPORTER	REPORTED BY
Macaca fuscata	30	East Germany	Japan	I
	5	U.S.A.	Canada	I/E
Macaca mulatta	13	Canada	U.S.A.	I
	207	Canada	U.S.A.	E
	21	Switzerland	West Germany	I
	1	Switzerland	West Germany	E
	7	Switzerland	U.K.	I
	8	Switzerland	Netherlands	I
	1	Switzerland	U.S.A.	E
	5	West Germany	Switzerland	E
	6	West Germany	Hungary	I
	4	West Germany	U.S.A.	I
	1	France	Switzerland	E
	18	France	U.K.	E
	14	France	U.S.A.	E
	240	U.S.A.	Bangladesh	I
	8	U.S.A.	Canada	I/E
	15	U.S.A.	Canada	E
	150	U.S.A.	Pakistan	I
Macaca nemestrina	20	Australia	Malaysia	I
	30	Australia	U.S.A.	I
	2	Canada	U.S.A.	E
	2	East Germany	West Germany	I
	2	France	U.S.A.	E
	10	U.K.	Malaysia	I
	30	U.K.	U.S.A.	E
	3	Italy	U.S.A.	E
	1	U.S.S.R.	Netherlands	I
	60	U.S.A.	Indonesia	I
	38	U.S.A.	Malaysia	I
Macaca nigra	1	Canada	U.S.A.	I
	2	Israel	Switzerland	E
	1	U.S.A.	Canada	I/E
	2	U.S.A.	Canada	E
Macaca sinica	6	U.K.	Sri Lanka	I
Macaca thibetana	15	U.K.	Netherlands	I
Papio spp.	24	Canada	U.S.A.	E
	50	France	U.K.	E
	105	France	U.S.A.	E
	50	U.S.A.	Ethiopia	I
Papio anubis	24	Switzerland	U.K.	I
	20	China	Ghana	E
	50	West Germany	Ethiopia	I
	12	West Germany	U.K.	I
	23	West Germany	Italy	I
	8	West Germany	Kenya	I
	2	U.S.A.	Canada	I/E
	44	U.S.A.	Ethiopia	I
	952	U.S.A.	Kenya	I
Papio cynocephalus	4	Sweden	U.K.	I
	46	U.S.A.	Kenya	I
Papio hamadryas	3	Canada	U.S.A.	I
	6	Canada	U.S.A.	E
	1	East Germany	West Germany	I
	6	West Germany	East Germany	E
	15	Denmark	Sweden	I
	5	Netherlands	East Germany	E
	138	Netherlands	Denmark	E
	8	U.S.A.	Canada	E
Papio (=Mandrillus) leucophaeus	1	Canada	U.S.A.	I
	1	West Germany	Austria	I
	1	U.S.A.	Canada	I/E
	1	U.S.A.	Canada	E
Papio papio	15	Spain	France	E
Papio (=Mandrillus) sphinx	1	Austria	Spain	I
	1	Canada	U.S.A.	I
	2	West Germany	Canada	E
	2	Japan	U.K.	E
	2	Netherlands	East Germany	E
	1	U.S.A.	Canada	E
Presbytis cristata	4	Australia	Indonesia	I
Presbytis obscura	2	East Germany	Switzerland	E
	1	U.S.A.	Netherlands	I
Rhinopithecus roxellanae	2	Hong Kong	China	I
Theropithecus gelada	2	Canada	U.S.A.	I
	1	Sri Lanka	Switzerland	E
	2	U.S.A.	Canada	E
TOTAL	27,077			

TABLE 4
NATIONAL PERCENTAGES OF IMPORT TRANSACTIONS REPORTED FOR 1979

Australia	100%
Gambia	100%
Hong Kong	100%
Denmark	90%
Switzerland	84%
Sweden	80%
East Germany	75%
U.S.A.	70%
U.K.	63%
Canada	59%
West Germany	59%
U.S.S.R.	57%
South Africa	33%
France	23%
Indonesia	0%
Sri Lanka	0%
Venezuela	0%

Note: Not parties to CITES during 1979: Belgium, China, Colombia, Cuba, Czechoslovakia, El Salvador, Gabon, Guatemala, Israel, Italy, Ivory Coast, Japan, North Korea, Lebanon, Mexico, Netherlands, New Zealand, Poland, Spain, Thailand. All appear as importers on Table 3.

Source: Table 3 (see text)

TABLE 5
ESTIMATED MINIMUM IMPORTS WORLDWIDE 1979

RANK	COUNTRY	KNOWN IMPORTS	COMMENTS (see text)	SOURCES (in addition to CITES reports for 1979)
EUROPEAN ECONOMIC COMMUNITY				
12	Belgium	842	Probable under-estimate	Darsono (1979); W. Kadri (pers. comm., 1982); Mack & Eudey (this volume); Nordin & Hasnah Samian (1981); B.M.B. Papé (pers. comm., 1982).
20	Denmark	202		Darsono (1979)
10	France	1,299	Probable under-estimate	Darsono (1979); Gabonese Government Statistics (1982); Mack & Eudey (this volume).
8	West Germany	2,104		W. Kadri (pers. comm., 1982); Mack & Eudey (this volume).
21	Greece	150		W. Kadri (pers. comm., 1982); Nordin & Hasnah Samian (1981).
9	Italy	1,823		Darsono (1979); Gabonese Government Statistics (1982); Mack & Eudey (this volume); Nordin & Hasnah Samian (1981).
6	Netherlands	3,355	Mainly re-exported	Darsono (1979); Dutch Government Statistics (1982); W. Kadri (pers. comm., 1982); C.E. Norris (pers. comm., 1981).
3	U.K.	6,678	Likely to be relatively accurate.	Kavanagh (1982).
WESTERN EUROPE OUTSIDE THE E.E.C.				
23	Austria	91	Under-estimate?	Darsono (1979); Gabonese Government Statistics (1982); C.E. Norris (pers. comm., 1981).
18	Spain	219	Under-estimate?	Gabonese Government Statistics (1982); W. Kadri (pers. comm., 1982).
7	Sweden	3,227		Darsono (1979).
19	Switzerland	211	Likely to be relatively accurate.	
EASTERN EUROPE				
30	Czechoslovakia	11	Under-estimate?	
25	East Germany	51	Under-estimate?	
22	Hungary	100	Under-estimate?	C.E. Norris (pers. comm., 1981).
17	Poland	305	Under-estimate?	C.E. Norris (pers. comm., 1981); B.M.B. Papé (pers. comm., 1982).
11	U.S.S.R.	1,147	Probable under-estimate?	Darsono (1979); Mack & Eudey (this volume); C.E. Norris (pers. comm., 1981).
16	Yugoslavia	350	Under-estimate?	Nordin & Hasnah Samian (1981); C.E. Norris (pers. comm., 1981).
ASIA				
26	Hong Kong	50		T. Sharr (pers. comm., 1982).
36	India	4		
40	Indonesia	2		

TABLE 5 (cont.)

RANK	COUNTRY	KNOWN IMPORTS	COMMENTS (see text)	SOURCES (in addition to CITES reports for 1979)
27	Israel	33		C.E. Norris (pers. comm., 1981).
2	Japan	8,136	Relatively accurate	Anon. (1979); Y. Kawanishi (pers. comm., 1981).
40	Jordan	2		B.M.B. Papé (pers. comm., 1982).
40	North Korea	2		
28	Kuwait	26		Darsono (1979).
29	Lebanon	16		Darsono (1979).
15	Singapore	408		W. Kadri (pers. comm., 1982); Nordin & Hashan Samian (1981); C.E. Norris (pers. comm., 1981); B.M.B. Papé (pers. comm., 1982).
4	Taiwan	5,970	Under-estimate?	Darsono (1979); Nordin & Hasnah Samian (1981); C.E. Norris (pers. comm., 1981); A.T. Viri (pers. comm., 1980).
31	Thailand	10		Nordin & Hasnah Samian (1981).
31	United Arab Emirates	10		B.M.B. Papé (pers. comm., 1982).
AUSTRALASIA				
14	Australia	581		W. Kadri (pers. comm., 1982).
35	New Zealand	7		
AFRICA				
36	Egypt	4		B.M.B. Papé (pers. comm., 1982).
39	Gabon	3		
34	Gambia	9		
45	Senegal	1		Gabonese Government Statistics (1982).
13	South Africa	606		
NORTH AMERICA				
5	Canada	3,474		Agriculture Canada Statistics (1982).
1	U.S.A.	22,801		Mack & Eudey (this volume).
SOUTH AND CENTRAL AMERICA AND THE CARIBBEAN				
31	Brazil	10		Mack & Eudey (this volume).
45	Colombia	1		I.R. Diaz (pers. comm., 1982).
40	Cuba	2		
40	Guatemala	2		
24	Mexico	60		
36	Venezuela	4		
TOTAL	46 Countries	64,399		

TABLE 6
ITALIAN IMPORTS OF LIVE PRIMATES 1980

Species	Number	Exporting Country
(APPENDIX I)		
Lemur variegatus[1]	2	Canada
Leontopithecus chrysomelas	4	Brazil
Leontopithecus chrysopygus	4	Brazil
Leontopithecus rosalia	4	Brazil
Callimico goeldii	16	Bolivia
Cacajao spp.	4	Bolivia
Brachyteles arachnoides	4	Brazil
Pan troglodytes	1	Togo
(APPENDIX II)		
Callithrix argentata	4	Bolivia
Saguinus imperator	6	Bolivia
Saimiri sciureus	700	Bolivia
Pithecia monachus	4	Canada
Pithecia pithecia	4	Canada
Callicebus moloch	4	Bolivia
Macaca fascicularis	210	Indonesia
Macaca fascicularis	196	U.S.A.
Macaca fascicularis	72	Philippines
Macaca fascicularis	4	Canada
Cercocebus spp.	8	Togo
Cercocebus spp.	2	Nigeria
Cercocebus albigena	20	Togo
Colobus polykomos	4	Togo
Cercopithecus aethiops	190	U.S.A.
Cercopithecus aethiops	145	Kenya
Cercopithecus aethiops	9	Sierra Leone
Cercopithecus aethiops	100	Ethiopia
Cercopithecus aethiops	34	Togo
Cercopithecus ascanius	48	Togo
Cercopithecus hamlyni	4	Togo
Cercopithecus mona	20	Togo
Cercopithecus mona	6	Sierra Leone
Cercopithecus diana	10	Togo
Cercopithecus nictitans	39	Togo
Erythrocebus patas	8	Togo
Galago senegalensis	10	Togo
TOTAL	1,900	

[1]Usually known as *Varecia Variegata*

Source: Italian CITES report (1980)

TABLE 7
DUTCH IMPORTS OF LIVE PRIMATES 1977-1981

Year	Species	Country of Origin	Number
1977	*Callithrix jacchus*	?	10
	Macaca fascicularis	Indonesia	355
	Cercopithecus aethiops	Kenya	300
	Papio anubis/cynocephalus	Kenya	50
			715
1978	*Saimiri sciureus*	?	55
	Macaca mulatta	?	40
	Macaca fascicularis	Indonesia	2,331
	Cercopithecus aethiops	Kenya	2,043
	Papio anubis/cynocephalus	Kenya	453
			4,922
1979	*Macaca nemestrina*	Indonesia	110
	Macaca fascicularis	Indonesia	3,450
	Cercopithecus aethiops	Kenya	2,660
	Papio anubis/cynocephalus	Kenya	885
	Papio hamadryas	Kenya	138
			7,243
1980	*Macaca fascicularis*	Indonesia	1,320
	Cercopithecus aethiops	Kenya	3,540
	Papio anubis/cynocephalus	Kenya	355
	Papio hamadryas	Kenya	280
			5,495
1981	*Macaca fascicularis*	Indonesia	195
	Cercopithecus aethiops	Kenya	1,555
	Papio anubis/cynocephalus	Kenya	500
			2,250

Source: Flora and Fauna Division of the Dutch Ministry of Culture (1982).

TABLE 8
U.K. IMPORTS OF LIVE PRIMATES 1965-1975

(The numbers in parentheses are percentages of the total number imported that year)

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
Lemuridae	4	1	1	2	34	6	-	5	16	-	1
	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)
Tarsiidae	60	10	4	-	-	1	-	-	-	1	-
	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)
Callitrichidae	1,507	2,112	1,278	429	437	413	322	339	1,040	517	163
	(5%)	(7%)	(5%)	(4%)	(4%)	(4%)	(2%)	(3%)	(9%)	(4%)	(2%)
Cebidae	6,444	5,360	3,697	1,543	1,726	892	809	1,155	589	1,321	500
	(21%)	(19%)	(14%)	(13%)	(14%)	(8%)	(6%)	(9%)	(5%)	(11%)	(6%)
Cercopithecidae	23,176	21,066	21,198	10,070	9,978	10,376	11,827	11,557	9,960	10,678	7,487
	(74%)	(74%)	(81%)	(83%)	(82%)	(89%)	(91%)	(88%)	(86%)	(85%)	(92%)
Pongidae	84	52	57	26	59	6	4	31	42	7	7
	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)
TOTALS	31,275	28,601	26,235	12,070	12,234	11,694	12,962	13,087	11,647	12,524	8,158

Note: The data for 1965-67 are based on licenses issued and may therefore be a considerable exaggeration of the real imports.

Source: Burton (1978).

TABLE 9
U.K. IMPORTS OF LIVE PRIMATES 1976-1980: COUNTRIES OF EXPORT

	1976	1977	1978	1979	1980
ASIA					
Hong Kong	2	-	-	-	-
Indonesia	-	150	-	1,094	2,420
Laos	2	-	-	-	-
Malaysia	-	1,505	622	10	1,221
Philippines	-	-	-	-	1,404
Sri Lanka	-	-	-	6	-
Thailand	-	-	-	-	50
	4	1,655	622	1,110	5,095
AFRICA					
Botswana	-	-	17	6	-
Chad	-	-	-	-	125
Ethiopia	-	-	50	-	758
Kenya	-	20	231	3	657
Senegal	-	-	116	-	1,411
Sierra Leone	-	2	-	-	-
Zambia	-	-	1	-	-
	-	22	415	9	2,951
CENTRAL & SOUTH AMERICA					
Bolivia	-	70	176	60	139
Colombia	-	-	20	12	-
Guyana	-	-	40	-	720
Panama	3	36	83	-	-
Paraguay	-	-	9	57	50
	3	106	328	129	909
NORTH AMERICA					
Canada	-	-	-	-	19
U.S.A.	-	30	-	-	4
	-	30	-	-	23
EUROPE					
Denmark	4	-	20	-	-
Ireland	5	4	-	-	-
France	6	3	-	-	2
East Germany	-	-	-	-	3
West Germany	-	-	-	2	-
Netherlands	3	10	5	15	-
	18	17	25	17	5
Annual totals:	25	1,830	1,390	1,262	8,983
MAFF annual totals[1]	NA	NA	10,474	6,678	6,290

NOTE: [1] The MAFF (Ministry of Agriculture, Fisheries and Food) keeps separate records of imported primates subjected to quarantine controls. MAFF's totals are considered more accurate than those given by the Dept. of the Environment.

Source: U.K. Department of the Environment.

TABLE 10
BEST ESTIMATES OF U.K. LIVE PRIMATE IMPORTS 1965-1981

Year	Total	Source	Comments
1965	31,275	Burton (1978)	Based on licenses issued and
1966	28,601	″	may therefore be a
1967	26,235	″	considerable exaggeration.
1968	12,070	″	
1969	12,234	″	
1970	11,694	″	
1971	12,962	″	
1972	13,087	″	
1973	11,647	″	
1974	12,524	″	
1975	8,158	″	
1976	9,232	MAFF	Prevailing annual average
1977	9,232	″	between Feb. '75 & Nov. '78.
1978	10,474	″	MAFF figures.
1979	6,678	″	Likely to be accurate.
1980	6,290	″	
1981	6,231	″	

TABLE 11
U.K. IMPORTS OF LIVE PRIMATES 1980: SPECIES AND EXPORTING COUNTRIES

Species	Exporting country	Numbers
LEMURIDAE		
Cheirogaleus medius	U.S.A.	1
Lemur macaco	U.S.A.	2
Lemur variegatus[1]	U.S.A.	1
CEBIDAE		
Alouatta caraya	Paraguay	30
Callicebus moloch	Bolivia	11
Cebus apella	Guyana	20
	Paraguay	20
Lagothrix lagotricha	Bolivia	68
Saimiri sciureus	Bolivia	60
	Guyana	700
CERCOPITHECIDAE		
Cercopithecus aethiops	Kenya	51
Cercopithecus neglectus	Canada	19
Cercocebus torquatus	France	2
Colobus polykomos	East Germany	3
Erythrocebus patas	Chad	125
Macaca fascicularis	Indonesia	2,420
	Malaysia	1,201
	Philippines	1,404
Macaca mulatta	Thailand	50
Macaca nemestrina	Malaysia	20
Papio anubis	Ethiopia	600
	Kenya	439
	Senegal	260
Papio cynocephalus	Kenya	166
Papio hamadryas	Ethiopia	158
Papio papio	Senegal	1,151
PONGIDAE		
Pan troglodytes	Kenya	1
	TOTAL	8,983

[1] Usually known as *Varecia variegata.*

Source: U.K. Department of the Environment

TABLE 12
LIVE PRIMATE IMPORTS TO UK BY SHAMROCK FARMS (GB) LTD 1978-1981

	1978								1979						1980							1981					
	Saimiri sp.	*Cebus* sp.	*M. fascicularis*	*M. mulatta*	*M. nemestrina*	*Papio* sp.	*C. aethiops*	*E. patas*	*M. fascicularis*	*M. mulatta*	*Papio* sp.	*C. aethiops*	*E. patas*	*P. troglodytes*	*Saimiri* sp.	*Cebus* sp.	*Aotus* sp.	*M. fascicularis*	*Papio* sp.	*C. aethiops*	*E. patas*	*Saimiri* sp.	*Cebus* sp.	*M. fascicularis*	*Papio* sp.	*C. aethiops*	*E. patas*
Chad								100					52								75						
Ethiopia						630	31				652								501						650		
Ghana								10																			
Kenya						385	10				383	10							334	41					422	230	
Mauritius									39																		
Nigeria								38																			
Senegal						351					160		19						155		81				160		35
Sierra Leone														3													
Bolivia	50	8																									
Guyana															50	20						33	10				
Bangladesh				100						40																	
India				196																							
Indonesia			200						1,332									2,030						1,511			
Malaysia			1,861		6				1,484									541						1,070			
Philippines			206															958						892			
USA																6	14										
Species Totals	50	8	2,267	296	6	1,366	41	148	2,855	40	1,195	10	71	3	50	26	14	3,529	990	41	156	33	10	3,473	1,232	230	35
Annual Grand Totals	4,182								4,174						4,806							5,013					

Source: J. Bradshaw (pers. comm., 1982) for Shamrock Farms (Great Britain) Ltd.

TABLE 13
LIVE PRIMATE IMPORTS TO U.K. BY RAVENSDEN ZOO LTD 1976-1981

Exporting Country	1976	1977	1978	1979	1980	1981
Bolivia	76	157	51	96	97	246
Botswana	6	20	17	6	-	22
Canada	8	2	-	-	6	9
France	-	-	-	-	1	-
East Germany	2	-	-	-	3	2
Ghana	18	10	-	-	-	-
Greece	-	-	-	1	-	-
Guyana	146	-	40	30	76	88
Indonesia	19	-	-	18	-	-
Kenya	5	7	-	-	1	-
Laos	2	-	-	-	-	-
Netherlands	3	-	-	-	-	-
Panama	-	99	15	2	-	-
Paraguay	-	30	9	42	30	-
Sierra Leone	21	-	-	-	-	-
Singapore	8	-	-	-	-	-
South Africa	-	1	-	-	-	-
Sri Lanka	-	-	-	4	6	-
Sweden	-	5	-	-	-	2
Tanzania	-	-	-	-	-	2
Zambia	-	-	1	-	-	-
TOTALS	314	331	133	199	220	371

Source: B.M.B. Papé, pers. comm. (Ravensden Zoo files), 1982.

TABLE 14
SWISS IMPORTS OF LIVE PRIMATES 1975-1980

Use	Species	1975	1976	1977	1978	1979	1980
Biomedical research	*Callithrix jacchus*	-	-	4	24	38	66
	Saguinus midas	-	-	-	1	-	-
	Saguinus oedipus	-	-	-	1	-	-
	Cebuella pygmaea	-	-	-	2	-	-
	Cebus spp.	5	-	16	-	12	-
	Cebus albifrons	-	-	8	-	-	8
	Saimiri sciureus	64	122	12	20	40	60
	Aotus trivirgatus[1]	-	-	1	4	-	-
	Ateles spp.	-	8	-	3	-	-
	Lagothrix lagotricha	-	-	1	-	-	-
	Cercopithecus aethiops	20	-	20	-	-	-
	Erythrocebus patas	-	3	5	5	-	-
	Papio anubis	-	6	-	26	24	-
	Macaca arctoides	20	20	10	-	-	-
	Macaca fascicularis	24	44	82	32	45	19
	Macaca mulatta	99	111	33	40	36	65
	SUB-TOTALS	232	314	192	158	195	218
Public display		12	9	7	15	4	3
Pets		1	-	1	-	2	1
	TOTALS	245	323	200	173	201	222

[1] The genus *Aotus* has recently been divided into 9 separate species (Hershkovitz, 1983).

Sources: Dollinger (1979; pers. comm. 1980); Swiss CITES report for 1980.

TABLE 15
JAPANESE IMPORTS OF LIVE PRIMATES 1970-1981: COUNTRIES OF EXPORT

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
ASIA												
Bangladesh	-	-	-	30	-	-	116	-	-	-	-	-
Burma	-	-	-	-	-	-	-	-	-	-	34	-
China	-	-	134	-	-	58	155	-	-	69	97	117
Hong Kong	-	26	391	56	20	86	-	49	-	40	-	-
India	100	145	393	443	429	311	521	535	56	22	15	-
Indonesia	4,029	6,814	14,236	14,247	3,733	2,060	3,723	3,138	3,022	3,428	1,691	1,511
Kampuchea	90	-	-	-	-	-	-	-	-	-	-	-
Laos	3	6	39	335	55	273	204	132	202	97	166	-
Malaysia	1,611	1,559	1,200	1,051	1,041	1,037	849	1,030	1,433	1,164	378	457
Pakistan	785	102	108	-	-	-	-	-	-	-	-	-
Philippines	275	440	163	-	-	-	-		80	175	542	164
Singapore	665	287	124	58	4	-	34	-	-	-	-	-
Sri Lanka	-	-	-	-	-	-	-	5	9	-	-	-
Taiwan	527	491	406	101	31	-	-	-	-	-	-	-
Thailand	608	1,410	1,911	736	219	503	-	40	13	71	54	-
Vietnam	-	-	-	24		-	-	-	-	-	-	-
	8,693	11,280	19,105	17,081	5,532	4,328	5,602	4,929	4,815	5,066	2,977	2,249

TABLE 15 (cont.)

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
CENTRAL & SOUTH AMERICA												
Bolivia	-	-	-	1,770	453	456	1,100	1,678	2,248	2,436	1,647	1,938
Brazil	168	481	199	-	14	-	-	-	-	-	-	-
Colombia	133	85	115	25	48	108	43	-	-	-	-	-
Costa Rica	6	11	9	-	-	-	-	-	-	-	-	-
Guyana	-	-	-	-	-	10	10	-	70	50	-	-
Nicaragua	10	-	-	-	-	-	20	10	-	-	-	-
Panama	17	35	45	36	-	-	30	50	57	30	-	-
Paraguay	-	-	287	115	35	62	-	48	20	10	-	-
Peru	242	483	957	966	-	50	-	50	-	40	36	10
	576	1,095	1,612	2,912	550	686	1,203	1,836	2,395	2,566	1,683	1,948
NORTH AMERICA												
Canada	-	-	-	-	4	-	7	3	2	5	19	-
U.S.A.	1,335	1,528	1,117	1,064	198	417	200	158	257	137	75	247
	1,335	1,528	1,117	1,064	202	417	207	161	259	142	94	247

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
AFRICA												
Algeria	1	-	-	-	-	-	-	-	-	-	-	-
Angola	-	-	-	-	20	-	-	-	-	-	-	-
Botswana	-	-	-	-	29	-	6	-	-	-	-	-
Cameroon	-	-	-	5	2	-	-	7	8	11	7	-
Ethiopia	236	39	313	455	242	347	321	318	87	250	350	120
Gabon	1	-	-	-	-	-	-	-	-	-	-	-
Ghana	9	10	6	23	93	-	21	41	12	-	-	-
Kenya	30	20	34	14	23	71	-	37	40	-	30	65
Liberia	-	3	3	9	-	-	-	-	-	-	-	-
Nigeria	14	10	2	-	-	-	-	-	-	-	-	-
Sierra Leone	44	34	87	54	62	60	54	53	74	25	42	8
Somalia	-	-	-	-	-	-	-	-	-	-	-	2
South Africa	-	-	2	-	-	-	-	-	-	-	-	-
Tanzania	-	-	-	-	-	-	-	5	-	-	-	-
Togo	2	-	-	-	-	-	-	-	-	-	-	-
Uganda	121	155	20	-	-	-	-	-	-	-	-	-
Zaire	-	-	-	-	-	-	-	-	-	-	-	12
	458	271	467	560	471	478	402	461	221	286	429	207

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
EUROPE												
Austria	-	-	-	-	1	-	-	-	-	4	31	-
Belgium	-	63	-	2	-	-	-	-	2	50	105	-
Denmark	3	2	13	10	3	-	-	1	-	-	-	-
France	2	-	1	-	-	-	-	-	-	-	-	-
West Germany	2	1	-	-	-	-	1	8	2	11	3	-
Luxembourg	-	-	-	-	-	-	-	-	-	-	7	-
Netherlands	6	29	55	5	-	2	9	4	-	-	-	-
U.K.	-	-	-	-	-	30	1	-	8	11	20	40
Switzerland	-	-	-	-	-	-	-	-	2	-	-	-
	13	95	69	17	4	32	11	13	14	76	166	40
Annual totals:	11,075	14,269	22,370	21,634	6,759	5,941	7,425	7,400	7,704	8,136	5,349	4,691

Sources: Anon. (1979); Y. Kawanishi (pers. comm., 1981).

TABLE 16
AUSTRALIAN IMPORTS OF LIVE PRIMATES 1975-1982

Purpose of Importation	1975	1976	1977	1978	1979	1980 (to 31 August)	From 1 September 1980 to 23 March 1982
Research	100	250	244	440	204	25	236
Zoological display	16	12	11	8	13	17	32
Circus display	-	-	2	-	4	-	8
TOTALS	116	262	257	448	221	42	276

Source: Australian National Parks and Wildlife Service. Statistics compiled by the Bureau of Customs (1982).

TABLE 17
CANADIAN IMPORTS OF LIVE PRIMATES 1975-1980: COUNTRIES OF EXPORT

	1975*	1976	1977	1978	1979	1980
U.S.A.	-	8	7	3 (3,054)	3 (3,328)	5 (2,531)
Belgium	-	1	-	- (-)	- (-)	- (19)
West Germany	-	-	-	7 (7)	- (7)	- (1)
Greece	-	-	-	- (-)	- (-)	- (1)
Netherlands	-	-	4	- (6)	- (-)	- (3)
Switzerland	-	-	2	- (4)	- (-)	- (-)
U.K.	-	-	-	2 (2)	- (-)	- (-)
Kenya	-	-	-	- (124)	- (71)	- (45)
South Africa	-	-	-	- (-)	- (1)	- (-)
Bolivia	-	-	-	- (2)	- (-)	- (-)
Colombia	-	-	-	- (1)	- (-)	- (-)
Guyana	-	-	-	- (-)	- (-)	- (16)
Mexico	-	-	-	- (1)	- (-)	- (-)
West Indies	-	-	-	- (-)	- (1)	- (-)
Indonesia	-	-	-	- (5)	- (45)	- (18)
Malaysia	-	-	-	- (-)	- (-)	- (1)
Unknown	-	-	-	- (-)	- (21)	- (-)
TOTALS	-	9	13	12 (3,206)	3(3,474)	5 (2,635)

* From 4 July, 1975 only.

Note: The figures in parentheses from 1978 to 1980 are statistics provided by Agriculture Canada for live animals entering Canada in accordance with the requirements of the Animal Diseases and Protection Act enforced by that department. The figures in front of the parentheses are from Canada's CITES reports.

Source: CITES reports, Canadian Wildlife Service.

TABLE 18
ESTIMATED MINIMUM EXPORTS WORLDWIDE 1979

RANK	COUNTRY	KNOWN EXPORTS	COMMENTS (see text)	SOURCES (in addition to CITES reports for 1979)
EUROPEAN ECONOMIC COMMUNITY				
16	Belgium	233	Probable under-estimate	Y. Kawanishi (pers. comm., 1981); Mack & Eudey (this volume)
57	Denmark	1		
31	France	50		
26	West Germany	75		Y. Kawanishi (pers. comm., 1981).
57	Greece	1		B.M.B. Papé (pers. comm., 1982).
24	Italy	83		
8	Netherlands	1,405	Under-estimate	
11	U.K.	579		Y. Kawanishi (pers. comm., 1981).
WESTERN EUROPE OUTSIDE THE E.E.C.				
48	Austria	7		Y. Kawanishi (pers. comm., 1981).
54	Finland	2		
57	Norway	1		
48	Spain	7		
35	Sweden	35		
29	Switzerland	59		
EASTERN EUROPE				
52	Czechoslovakia	3		
40	East Germany	20		
50	Hungary	6		
ASIA				
14	Bangladesh	388		J. Bradshaw (pers. comm., 1982); Mack & Eudey (this volume).
54	Burma	2		
27	China	71		Y. Kawanishi (pers. comm., 1981).
33	Hong Kong	45		Y. Kawanishi (pers. comm., 1981).
39	India	22		Y. Kawanishi (pers. comm., 1981).
1	Indonesia	17,907		Darsono (1979).
37	Japan	33		
21	Laos	97		Y. Kawanishi (pers. comm., 1981).
2	Malaysia	12,199		Nordin & Hasnah Samian (1981).
17	Pakistan	225	Improbable	
5	Philippines	5,225		Philippine Government Statistics (1982)
46	Sri Lanka	10		B.M.B. Papé (pers. comm., 1982).
22	Thailand	95		Y. Kawanishi (pers. comm., 1981)
AFRICA				
25	Botswana	82		
41	Cameroon	19		Y. Kawanishi (pers. comm., 1981)
30	Chad	52		J. Bradshaw (pers. comm., 1982).
7	Ethiopia	1,848	Under-estimate	J. Bradshaw (pers. comm., 1982); Y. Kawanishi (pers. comm., 1981); Mack & Eudey (this volume).
42	Gabon	13		Gabonese Government Statistics (1982).
38	Ghana	28		

TABLE 18 (cont.)

RANK	COUNTRY	KNOWN EXPORTS	COMMENTS (see text)	SOURCES (in addition to CITES reports for 1979)
AFRICA				
3	Kenya	9,519		J. Bradshaw (pers. comm., 1982); Dutch Government Statistics (1982); Mack & Eudey (this volume); C.E. Norris (pers. comm., 1981).
44	Madagascar	12		
34	Mauritius	39		J. Bradshaw (pers. comm., 1982).
28	Nigeria	65		
18	Senegal	182	Under-estimate?	J. Bradshaw (pers. comm., 1982).
35	Sierra Leone	35		J. Bradshaw (pers. comm., 1982); Y. Kawanishi (pers. comm., 1981).
9	Somalia	1,216		Mack & Eudey (this volume).
51	South Africa	5		
NORTH AMERICA				
52	Bermuda	3		
19	Canada	158		
4	U.S.A.	5,229		Agriculture Canada Statistics (1982); Y. Kawanishi (pers. comm., 1981); Mack & Eudey (this volume).
SOUTH AND CENTRAL AMERICA AND THE CARIBBEAN				
54	Barbados	2		
6	Bolivia	5,203		Y. Kawanishi (pers. comm., 1981); Mack & Eudey (this volume); B.M.B. Papé (pers. comm., 1982).
44	Colombia	12		
31	Costa Rica	50		Y. Kawanishi (pers. comm., 1981).
47	Guatemala	8		
13	Guyana	448		Mack & Eudey (this volume); B.M.B. Papé (pers. comm., 1982).
20	Honduras	150		
42	Nicaragua	13		Nicaraguan Government Statistics (1982).
15	Panama	355		Y. Kawanishi (pers. comm., 1981); B.M.B. Papé (pers. comm., 1982); D. Tovar (pers. comm., 1982).
12	Paraguay	554		Y. Kawanishi (pers. comm., 1981); Mack & Eudey (this volume).
10	Peru	712		Y. Kawanishi (pers. comm., 1981).
23	St. Kitts-Nevis-Anguilla	84		
TOTAL	59 countries	64,982		

TABLE 19
APPROXIMATE LEVELS OF COMBINED EXPORTS TO THE NETHERLANDS, THE U.K., JAPAN, CANADA AND THE U.S.A. BASED ON IMPORT DATA

	Exporting countries	1978		1979		1980		1981		Totals
1	Indonesia	11,102	(23%)	14,568	(32%)	10,703	(27%)	9,765	(26%)	46,138
2	Philippines	3,486	(7%)	4,920	(11%)	8,766	(22%)	7,286	(19%)	24,457
3	Bolivia	4,617	(10%)	4,595	(10%)	4,307	(11%)	7,912	(21%)	21,431
4	Kenya	4,879	(10%)	5,942	(13%)	6,176	(15%)	3,976	(11%)	20,973
5	Malaysia	9,188	(19%)	6,697	(15%)	1,960	(5%)	2,481	(6%)	20,326
6	U.S.A.	3,311	(7%)	3,465	(8%)	2,626	(7%)	2,440	(6%)	11,842
7	India	5,134	(11%)	22		15	-	-	-	5,171
8	Ethiopia	1,451	(3%)	1,659	(4%)	1,051	(3%)	970	(3%)	5,131
9	Somalia	1,032	(2%)	1,216	(3%)	1,404	(4%)	2	-	3,654
10	Guyana	543	(1%)	448	(1%)	1,000	(2%)	542	(2%)	2,533
11	Thailand	1,403	(3%)	471	(1%)	482	(1%)	100	-	2,456
12	Paraguay	179	-	513	(1%)	569	(1%)	-	-	1,261
13	Senegal	351	(1%)	179	-	236	(1%)	195	(1%)	961
14	Bangladesh	486	(1%)	388	(1%)	-	-	45	-	919
15	Leeward and Windward Islands	171	-	131	-	204	(1%)	470	(2%)	976
16	Panama	696	(1%)	32	-	-	-	-	-	728
17	Peru	-	-	40	-	136	-	252	(1%)	428
18	Belgium	2	-	208	-	124	-	-	-	334
19	China	-	-	69	-	97	-	131	-	297
20	Canada	13	-	18	-	151	-	63	-	245
21	Tanzania	-	-	-	-	-	-	203	(1%)	203
22	Nigeria	-	-	-	-	-	-	3	-	3
23	United Kingdom	-	-	-	-	-	-	25	-	25
	Totals	48,044		45,581		40,007		36,861		170,493

Note: This table gives approximate indications of export levels and should only be used in conjunction with the explanation in the text. Data from Mack (1982) and Mack & Eudey (this volume) include tree shrews (Tupaiidae).

Sources: Tables 7, 12, 13, 15, & 17: Mack (1982); Mack & Eudey (this volume). DoE data are not used for the U.K. because data from the actual importers are considered to be more reliably consistent over the period.

TABLE 20
U.K. EXPORTS OF LIVE PRIMATES 1976-1981

Importing Country	Species	1976	1977	1978	1979	1980	1981
Australia	*Callithrix jacchus*		-	30	-	-	-
Belgium	*Lagothrix lagotricha*		-	-	-	1	-
	Macaca fascicularis	-	-	-	-	-	140
Bulgaria	*Erythrocebus patas*	-	-	-	-	1	-
Canada	*Saguinus imperator*	-	-	-	-	-	6
	Macaca fascicularis	-	-	-		-	50
Cuba	*Cercopithecus neglectus*	-	-	-		-	1
	Erythrocebus patas	-				-	1
	Macaca fascicularis	-	-	-	-	-	30
	Papio (= Mandrillus) sphinx	-	-	-	-	-	2
Denmark	*Cebus apella*	-	-	-	-	5	-
	Cercopithecus aethiops		-	-	-	-	149
Finland	*Callithrix jacchus*		-			1	-
	Saguinus imperator	-	-	-	-	-	2
	Macaca arctoides	-	-	2	-	-	-
France	*Callithrix jacchus*	-	-	-	-	34	10
	Cebus apella			-		22	-
	Saimiri sciureus	-		-	-	4	2
	Cercopithecus aethiops					13	
	Colobus guereza	-	-	-	-	4	-
	Erythrocebus patas	-	-	-	-	46	-
	Macaca fascicularis	-	-	-	-	795	551
	Macaca mulatta	-	-	2	18	77	52
	Papio anubis			-	-	106	281
	Papio hamadryas					-	14
West Germany	*Callithrix jacchus*			60	-	18	80
	Saguinus imperator	-	-	-	-	-	6
	Saimiri sciureus	-		-	-	5	-
	Cercopithecus diana	-	-	-	-	-	1
	Cercopithecus neglectus			-	-	1	-
	Macaca arctoides	-	-	-	-	-	14
	Macaca fascicularis	-	-	-	-	6	-
	Macaca mulatta	-	-	-	-	-	2
	Macaca sinica	-	-	-	-	-	2
	Papio anubis	-	-	-	-	10	10
	Papio hamadryas	-	-	-	-	10	-
	Papio (= Mandrillus) leucophaeus	-	1	-	-	-	-
	Pongo pygmaeus	1			-		
Greece	*Macaca nemestrina*	-	-	3	-	-	-
Hong Kong	*Callithrix jacchus*	-	-	-	-	-	1
	Saimiri sciureus				-	4	
Hungary	*Callithrix jacchus*	-					12
India	*Callithrix jacchus*	-	-	24	-	-	-
Indonesia	*Macaca mulatta*	-	-	3	-	-	-
Iraq	*Callithrix jacchus*	-	-	-	-	10	-
Ireland	*Saimiri sciureus*	-	-	-	-	3	-
	Macaca fascicularis	-	-	-	-	4	-
	Macaca nemestrina	-	-	-	-	-	2
Israel	*Macaca mulatta*	-	-	-	-	2	-
Italy	*Callithrix jacchus*	-	-	-	-	-	160
	Macaca fascicularis	-	-	-	-	-	144
Japan	*Callithrix jacchus*	-	-	6	-	-	40
	Cercopithecus aethiops	-	-	-	-	20	-
	Cercopithecus diana	-	-	-	1	-	-
	Cercopithecus neglectus	-	-	1	-	-	-
	Papio anubis	-	-	-	-	1	-
	Papio (= Mandrillus) sphinx	-	-	-	2	-	-
	Gorilla gorilla	-	-	-	-	1	1
Jersey (U.K.)	*Gorilla gorilla*	-	1	-		-	-
Mexico	*Erythrocebus patas*	-	-	-	-	100	-
	Macaca fascicularis	-	-	-	-	-	100
	Macaca mulatta	-	-	-	-	1	-
Netherlands	*Callithrix jacchus*	-	32	-		20	-
	Lagothrix lagotricha	-	-	11	-	-	-
	Pithecia pithecia	-	-	-	-	-	1
	Macaca mulatta	-	-	-	-	-	1
	Presbytis obscura	-	-	-	-	-	1
	Pongo pygmaeus	1	-	-	-	-	-
New Zealand	*Saguinus labiatus*	-	-	-	-	-	1
	Cercopithecus diana	-	-	-	-	-	1
Singapore	*Saimiri sciureus*	-	-	-	-	6	-
South Africa	*Callithrix jacchus*	-	1	-	-	32	-
	Cebus apella	-	-	-	4	-	-
	Macaca fascicularis	-	-	-	-	36	-
	Hylobates lar	-	-	-	1	-	-
Spain	*Cebus apella*	-	-		-	-	8
	Colobus polykomos	-	-	-	-	-	20
	Macaca fascicularis	-	-	-	-	40	90
	Papio (= Mandrillus) leucophaeus	-	1	-	-	-	-
Sweden	*Callithrix jacchus*	-	-	-	-	2	-
	Saguinus imperator	-	-	-	-	-	6
	Saimiri sciureus	-	-	-	-	6	-
	Cercopithecus aethiops	-	-	-	-	-	50
	Macaca fascicularis	-	-	-	-	375	400
	Papio anubis	-	-	-	-	1	2
	Papio cynocephalus	-	-	-	-	7	-
Switzerland	*Callithrix jacchus*	-	-	24	-	68	-
	Cebus apella	-	-	-	-	-	2
	Saimiri sciureus	-		-	-	28	-
	Macaca arctoides	-	-	-	-	-	5
	Macaca mulatta	-	-	-	-	16	37
Taiwan	*Callithrix jacchus*	-	-	-	-	3	-
United Arab Emirates	*Callithrix jacchus*		-	-	-	-	4
	Saguinus labiatus	-	-	-	-	-	3
	Aotus trivirgatus[1]	-	-	-	-	-	1
U.S.A.	*Callithrix jacchus*	-	48	-	-	-	-
	Annual Totals:	2	84	166	26	1,947	2,499

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[1] The genus *Aotus* was recently divided into 9 separate species (Hershkovitz, 1983).

Source: U.K. Department of the Environment (1982).

TABLE 21
EXPORTS OF LIVE PRIMATES FROM THE U.K. BY RAVENSDEN ZOO LTD. 1976-1981

Importing Country	**1976**	**1977**	**1978**	**1979**	**1980**	**1981**
Australia	-	-	12	1	-	-
Belgium	14	-	-	7	-	-
Bulgaria	4	-	-	-	1	-
Canada	-	-	2	-	-	4
Cuba	-	12	5	-	-	4
Czechoslovakia	4	4	3	8	2	-
Denmark	-	-	-	6	-	-
Egypt	-	4	2	4	-	-
Finland	-	2	-	-	-	4
France	4	3	7	-	2	12
"Germany"	-	18	13	2	-	7
East Germany	-	-	-	-	5	-
West Germany	1	3	4	9	1	-
Greece	2	-	8	-	-	-
Hong Kong	3	2	4	-	8	3
India	-	-	1	-	-	-
Ireland	-	1	4	-	-	4
Italy	-	-	-	-	-	1
Japan	-	-	2	7	-	-
Jordan	-	-	-	2	-	-
Mexico	-	-	-	-	1	-
Netherlands	-	8	-	2	-	-
New Zealand	-	-	18	7	2	4
Poland	2	41	17	4	-	-
Portugal	-	1	-	-	-	-
Singapore	-	8	16	2	6	-
South Africa	10	19	-	5	-	1
Spain	1	5	-	-	-	8
Sri Lanka	2	2	-	-	-	-
Sweden	3	-	-	6	10	8
Switzerland	-	-	-	-	1	-
Tunisia	-	2	-	-	-	-
U.A.E.	-	-	-	10	6	19
U.S.A.	-	4	-	-	-	-
Totals	50	139	118	82	45	79

Source: B.M.B. Papé (pers. comm., 1982).

TABLE 22
INDONESIAN EXPORTS OF LIVE MONKEYS BY SPECIES 1975-1978

Species	**1975**	**1976**	**1977**	**1978**
Macaca fascicularis	15,800	14,004	14,960	22,884
Macaca nemestrina	1,194	2,278	1,196	5,250
Macaca maura	20	-	-	-
Presbytis aygula	-	26	-	-
Presbytis cristata	8	45	50	8
Totals	17,022	16,353	16,206	28,142

Source: WWF Indonesia (1980)

TABLE 23
INDONESIAN EXPORTS OF LIVE MONKEYS 1978-1979: IMPORTING COUNTRIES

DESTINATION	**1978**[1]	**1979**[2]
Belgium	164	25
Denmark	-	30
France	165	80
Greece	20	-
Italy	1,565	1,005
Netherlands	1,263	1,395
U.K.	150	1,062
Austria	56	30
Spain	555	125
Sweden	535	1,675
U.S.S.R.	370	790
Japan	3,201	2,581
Kuwait	18	26
Lebanon	-	15
Taiwan	4,827	4,620
Thailand	1	-
Canada	-	18
U.S.A.	5,377	4,430
Totals	18,267	17,907

[1] Data for March 19 to 31 and December 21 to 31 are not available.
[2] Data only cover January 1 to September 17; all exports are macaques.

Source: Darsono (1979)

TABLE 24
INDONESIAN EXPORTS OF LIVE MACAQUES 1979-1981: IMPORTING COUNTRIES

	Macaca fascicularis			*Macaca nemestrina*		
DESTINATIONS	1979	1980	1981	1979	1980	1981
Belgium	250	200	60	-	-	-
West Germany	100	-	74	50	-	-
Greece	50	-	-	-	-	-
Italy	50	150	250	100	-	80
Netherlands	2,200	450	300	200	50	600
U.K.	660	1,910	1,375	250	100	745
Spain	200	-	-	-	-	-
Sweden	-	450	390	-	-	85
U.S.S.R.	300	1,110	450	100	-	610
Yugoslavia	-	100	550	-	-	150
Japan	2,625	1,582	1,544	500	61	646
Singapore	360	-	-	-	-	-
Taiwan	2,215	2,150	682	-	-	412
Australia	200	-	-	100	-	-
U.S.A.	2,900	4,342	6,590	405	169	144
Totals	12,110	12,444	12,265	1,705	380	3,472

Source: W. Kadri (pers. comm., 1982) for the Indonesian Directorate of Nature Conservation and Wildlife Management.

TABLE 25
MALAYSIAN EXPORTS OF LIVE MONKEYS 1974-1980: IMPORTING COUNTRIES

	1974	1975	1976	1977	1978	1979 (Jan-June)	1980
U.S.A.	1,853	3,242	3,718	3,518	5,842	2,304	1,120
U.K.	3,123	3,683	2,695	3,402	2,541	1,504	760
Japan	1,085	1,145	926	1,076	1,276	722	378
Taiwan	392	320	540	836	1,680	1,210	200
Belgium	301	-	464	220	838	480	60
"Germany"	106	144	144	-	204	491	-
Yugoslavia	350	365	320	380	640	150	230
Australia	70	182	230	524	440	47	175
Italy	539	265	252	262	256	120	-
Iran	-	-	-	140	135	-	-
Singapore	210	82	110	96	51	28	20
Hong Kong	-	-	60	52	82	40	-
Switzerland	-	21	24	58	24	14	-
Greece	-	-	-	-	50	100	19
Thailand	-	-	-	-	19	10	-
Iraq	-	-	-	-	20	-	-
Netherlands	72	90	15	15	-	-	-
Lebanon	-	-	-	6	-	-	-
U.S.S.R.	93	75	86	-	-	-	80
France	50	-	62	-	-	-	-
Denmark	-	-	30	-	-	-	-
Romania	23	100	-	-	-	-	150
Sweden	4	182	-	-	-	-	2
Annual Totals	8,271	9,896	9,676	10,579	14,098	7,220	3,194

Note: The total number of macaques exported during all of 1979 was 12,199.

Source: Nordin and Hasnah Samian (1981).

TABLE 26
MALAYSIAN EXPORTS OF LIVE MACAQUES 1976-1981: SPECIES

YEAR	*Macaca fascicularis*	*Macaca nemestrina*	TOTAL
1976	5,438	109	5,547
1977	3,098	-	3,098
1978	13,521	70	13,591
1979*	401	3,972	4,373
1980	3,104	[illegible]	3,113
1981	2,928	40	2,968

* It is likely that the 1979 trade figures for *M. fascicularis* and *M. nemestrina* provided by the Malaysian government were reversed.

Source: Malaysian Federal Department of Wildlife and National Parks (1982).

TABLE 27
PHILIPPINE EXPORTS OF LIVE MONKEYS BY A.T. VIRI & CO. INC., 1971-1979: IMPORTING COUNTRIES

	1971	1972	1973	1974	1975	1976	1977	1978	1979
U.S.A.	1,480	1,750	1,520	1,416	1,800	1,900	2,500	3,200	4,300
Netherlands	-	125	32	921	23	-	-	-	-
Japan	350	200	20	32	-	-	80	175	135
U.K.	-	-	-	-	-	100	100	200	-
Taiwan	-	-	-	-	-	-	60	50	100
Sweden	-	-	-	-	350	-	-	-	-
Canada	-	-	-	160	-	-	-	-	-
Austria	-	-	-	-	20	30	30	-	-
Germany	-	-	-	-	15	-	-	-	-
Annual totals	1,830	2,075	1,572	2,529	2,208	2,030	2,770	3,625	4,535

Source: A.T. Viri (pers. comm., 1980).

TABLE 28
PHILIPPINE EXPORTS OF LIVE *MACACA FASCICULARIS* 1978-1981: IMPORTING COUNTRIES

	1978	1979	1980	1981
U.S.A.	2,060	4,850	4,221	4,163
U.K.	700	-	1,102	964
Switzerland	-	-	1	150
Italy	-	-	-	189
Austria	-	-	-	10
"Germany"	-	-	-	1
Japan	50	375	513	76
Taiwan	-	-	300	400
China	50	-	-	-
Iran	-	-	1	-
United Arab Emirates	-	-	-	5
Singapore	-	-	-	1
Annual totals	2,860	5,225	6,138	5,959

Source: Ministry of Natural Resources, Republic of the Philippines (1982)

TABLE 29
GABONESE EXPORTS OF LIVE PRIMATES 1979-1981

Year	Species	Numbers	Destinations
1979	Monkeys	7	France
		1	Italy
		1	Senegal
		1	Spain
	Pan troglodytes	1	Austria
		2	France
1980	Monkeys	14	France
	Pan troglodytes	1	France
1981	Monkeys	9	France
		1	Libya
		1	Nigeria
	Pan troglodytes	1	Italy
	Gorilla gorilla	1	U.K.

Source: Director of Wildlife and Hinting, Republic of Gabon (1982)

TABLE 30
KENYAN EXPORTS OF LIVE PRIMATES 1979-1980: GREEN MONKEYS AND BABOONS

Destinations	Species	1979	1980
Austria	*Papio* spp.	60	-
Belgium	*Cercopithecus aethiops*	-	420
Canada	*Cercopithecus aethiops*	-	45
Denmark	*Cercopithecus aethiops*	-	25
France	*Cercopithecus aethiops*	-	65
West Germany	*Cercopithecus aethiops*	209	484
	Papio spp.	-	60
Hungary	*Cercopithecus aethiops*	100	20
Israel	*Cercopithecus aethiops*	30	-
	Papio spp.	-	93
Italy	*Cercopithecus aethiops*	-	105
Japan	*Cercopithecus aethiops*	-	27
Netherlands	*Cercopithecus aethiops*	805	440
	Papio spp.	-	55
Poland	*Cercopithecus aethiops*	300	324
Singapore	*Papio* spp.	18	-
Taiwan	*Papio* spp.	40	-
U.S.S.R.	*Cercopithecus aethiops*	335	1,321
U.K.	*Cercopithecus aethiops*	60	41
	Papio spp.	190	332
U.S.A.	*Cercopithecus aethiops*	350	791
	Papio spp.	619	625
Yugoslavia	*Cercopithecus aethiops*	200	700
	Papio spp.	-	30
Totals: Green monkeys (*Cercopithecus aethiops*)		2,389	4,808
Baboons (*Papio* spp.)		927	1,195
Grand totals		3,316	6,003

Source: C.E. Norris (pers. comm., 1981); TRAFFIC East Africa

TABLE 31
SENEGALESE EXPORTS OF LIVE PRIMATES 1976-1980

Year	Totals Exported
1976	939
1977	77
1978	80
1979	24
1980	240

Source: Ministry of Rural Development, Republic of Senegal (1982)

TABLE 32
UGANDAN EXPORTS OF LIVE PRIMATES 1974-1982

Year	Species	Numbers	Destinations	Uses
1974	*Cercopithecus neglectus*	33	Not known	Not known
1975	*Cercopithecus aethiops*	46	U.K., Italy, U.S.S.R.	Zoos & Parks
	Cercopithecus neglectus	69	Not known	Not known
	Erythrocebus patas	20	U.K.	Zoos & Parks
1976	*Cercopithecus aethiops*	52	U.K., Italy, U.S.S.R.	Not known
	Cercopithecus ascanius	12	Not known	Not known
	Cercopithecus neglectus	7	Italy (1) & Not known	Not known
	Colobus guereza	44	Not known	Not known
1977	*Cercopithecus aethiops*	1	Italy	Not known
	Colobus guereza	42	Not known	Not known
1978	*Cercopithecus aethiops*	1	Not known	Not known
1979	—	—	—	—
1980	*Erythrocebus patas*	1	U.K.	Not known
1981	*Cercopithecus aethiops*	1	Egypt	Not known
1982	*Cercopithecus aethiops*	11	Dubai (1) & Not known	Not known
	Pan troglodytes	2	North Korea	Zoo

Source: Game Department of Uganda (1982)

TABLE 33
BOLIVIAN EXPORTS OF LIVE PRIMATES JANUARY TO NOVEMBER 1982

Species	Number
Alouatta spp.	8
Aotus trivirgatus[1]	46
Ateles paniscus	5
Callithrix argentata	87
Cebuella pygmaea	3
Cebus albifrons	54
Cebus apella	43
Pithecia hirsuta	3
Pithecia monachus	20
Saguinus fuscicollis	37
Saguinus labiatus	342
Saimiri sciureus	618
Total	1,266

[1] The genus *Aotus* has recently been divided into 9 separate species (Hershkovitz, 1983).

Source: G. Bejarano (pers. comm., 1982) from Bolivian export certificates.

TABLE 34
CANADIAN EXPORTS OF LIVE PRIMATES 1975-1980

Importing Country	Species	1975	1976	1977	1978	1979	1980
Australia	*Lemur catta*	-	-	-	-	4	-
	Lemur macaco	-	-	-	-	4	-
	Cercopithecus neglectus	-	-	-	3	-	-
China	*Papio (= Mandrillus)* sphinx	-	-	-	-	-	1
West Germany	*Lemur catta*	-	-	-	-	-	1
	Macaca nigra	-	-	-	2	-	-
	Macaca sylvanus	-	-	-	-	-	4
	Papio (= Mandrillus) sphinx	-	-	-	-	2	-
	Hylobates hoolock	-	-	-	1	-	-
	Pan troglodytes	-	-	-	1	-	-
	Pongo pygmaeus	2	4	-	-	1	-
Hong Kong	*Ateles geoffroyi*	-	6	-	-	-	-
Italy	*Lemur variegatus*[1]	-	-	-	-	-	2
	Saguinus midas	-	-	-	-	-	2
	Pithecia pithecia	-	-	-	-	-	3
Japan	*Lemur catta*	-	-	2	-	5	-
	Ateles spp.	-	-	-	-	-	3
	Ateles belzebuth	-	-	-	1	-	1
	Ateles paniscus	-	-	-	1	-	-
	Cercopithecus aethiops	-	-	-	-	-	3
	Cercopithecus diana	-	-	-	-	-	2
	Cercopithecus neglectus	-	-	-	-	-	2
	Macaca silenus	-	-	-	-	-	3
	Papio (= Mandrillus) sphinx	-	-	-	-	-	3
	Pan troglodytes	-	-	-	1	-	1
South Africa	*Macaca silenus*	-	-	1	-	-	
Switzerland	*Lagothrix lagotricha*	-	-	-	1	-	-
Taiwan	*Pongo pygmaeus*	-	1	-	-	-	-
Trinidad	*Pan troglodytes*	-	-	3	-	-	-
U.K.	*Cercopithecus neglectus*	-	-	-	-	-	6
U.S.A.	*Lemur catta*	-	-	-	-	-	3
	Lemur macaco	-	-	-	-	-	4
	Galago(=Otolemur) crassicaudatus	-	-	-	8	4	-
	Nycticebus coucang	-	-	2	-	-	-
	Perodicticus potto	-	-	-	1	-	-
	Saguinus midas	-	-	-	-	-	8
	Saguinus nigricollis	-	-	1	-	-	-
	Saguinus oedipus	-	-	1	-	-	-
	Aotus trivirgatus ±	-	-	-	-	1	-
	Saimiri sciureus	-	-	-	9	-	-
	Cercopithecus albogularis	-	-	1	-	-	-
	Cercopithecus ascanius	-	-	1	-	-	-
	Cercopithecus diana	-	-	-	-	2	-
	Cercopithecus mitis	-	-	7	-	-	-
	Cercopithecus mona	-	-	-	1	-	-
	Cercopithecus neglectus	-	-	-	-	1	-
	Cercopithecus petaurista	-	-	1	-	-	-
	Colubus guereza	-	-	-	-	-	2
	Erythrocebus patas	-	-	3	8	-	-
	Macaca arctoides	-	-	1	-	-	-
	Macaca fuscata	-	-	-	3	5	6
	Macaca mulatta	-	-	-	26	10	88
	Macaca nigra	-	-	-	-	2	7
	Macaca silenus	-	1	-	-	1	-

TABLE 34 (cont.)

Importing Country	Species	1975	1976	1977	1978	1979	1980
	Papio anubis	-	-	-	-	2	-
	Papio hamadryas	-	-	8	-	5	4
	Papio (= Mandrillus) leucophaeus	-	-	-	-	1	-
	Papio papio	-	-	-	-	-	6
	Presbytis cristata	-	-	-	2	-	-
	Hylobates hoolock	-	-	-	-	-	3
	Gorilla gorilla	-	-	-	-	-	1
	Pan troglodytes	-	-	2	1	3	-
	Pongo pygmaeus	-	-	1	-	-	-
Totals		2	12	35	70	53	169

[1] Usually known as *Varecia variegata.*

[2] The genus *Aotus* has recently been divided into 9 separate species (Hershkovitz, 1983).

Source: CITES reports, Canadian Wildlife Service

TABLE 35
THE PRIMATE TRADE IN NICARAGUA 1975-1979

	Year	Numbers	Destination	Origin
Exports				
	1975	343	U.S.A., Mexico	-
	1976	163	U.S.A., Austria Japan, Netherlands	-
	1977	67	U.S.A., El Salvador	-
	1978	1	U.S.A.	-
	1979	13	Guatemala, Spain, El Salvador	-
Imports				
	1976	5	-	Costa Rica
	1976	1	-	Panama

Source: Institute of Natural Resources and the Environment, Republic of Nicaragua (1982)

TABLE 36
PRIMATE FAMILIES IN TRADE 1979

Family		Numbers traded	
Cercopithecidae		16,915	(62.6%)
(Cercopithecinae	16,885)		
(Colobinae	30)		
Cebidae		2,398	(8.9%)
Callitrichidae		2,056	(7.6%)
Pongidae		164	(0.6%)
Lorisidae		142	(0.5%)
Lemuridae		79	(0.3%)
Hylobatidae		22	(0.1%)
Unidentified		5,251	(19.4%)
Totals		27,027	(100%)

Source: Table 3 (CITES tabulation)

TABLE 37
PRIMATE GENERA IN TRADE 1979

Genus	Numbers traded	
Macaca	13,142	(60%)
Cercopithecus	2,033	(9%)
Saimiri	1,887	(8%)
Papio	1,624	(7%)
Saguinus	1,382	(6%)
Callithrix	618	(3%)
Cebus	257	(1%)
Aotus	229	(1%)
Pan	142	(1%)
Galago (incl. *Otolemur*)	119	(1%)
Others	343	(2%)
Total identified	21,776	100%

Source: Table 3 (CITES tabulation)

TABLE 38
ALL CITES TRANSACTIONS IN DEAD PRIMATES AND THEIR DERIVATIVES WORLDWIDE 1979

SPECIES	IMPORTER	EXPORTER	ITEMS	REPORTED BY
APPENDIX I				
Lemur albifrons	Switzerland	West Germany	1 skull	I
Lemur macaco	Switzerland	Belgium	1 body	I
Microcebus murinus	U.S.A.	U.K.	2 bodies	I
Colobus badius	Canada	Kenya	2 skins	I
	Canada	South Africa	1 skin	I
Pongo pygmaeus	Switzerland	West Germany	1 skeleton	I
APPENDIX II				
Primates spp.	Canada	U.S.A.	1 shipment of specimens	E
	Canada	country unknown	1 body	I
	U.S.A.	Botswana	12 trophies	I
	U.S.A.	South Africa	1 trophy	I
Arctocebus calabarensis	U.S.A.	U.K.	1 body	I
Galago senegalensis	U.S.A.	U.K.	3 bodies	I
Galago demidovii	U.S.A.	U.K.	6 bodies	I
Otolemur crassicaudatus	U.S.A.	U.K.	3 bodies	I
Callithrix argentata	Switzerland	West Germany	1 body	I
Callithrix jacchus	Norway	Denmark	1 body	I/E
Saguinus geoffroyi	U.S.A.	Panama	1 skull	E
Aotus trivirgatus[1]	Switzerland	West Germany	1 body	I
Cebus spp.	Norway	Denmark	1 body	I/E
Lagothrix lagotricha	Switzerland	West Germany	1 body	I
Cercopithecus aethiops	West Germany	South Africa	1 skin	E
	Spain	South Africa	1 trophy	E
	U.S.A.	South Africa	3 skulls	E
Cercopithecus cephus	U.S.A.	Canada	4 scraps	E
	U.S.A.	Canada	4 skin scraps	
Cercopithecus erythrotis	U.S.A.	Canada	1 scrap	E
	U.S.A.	Canada	1 skin scrap	
Cercopithecus nictitans	U.S.A.	Canada	2 scraps	E
	U.S.A.	Canada	2 skin scraps	
Colobus spp.	U.S.A.	Netherlands	500 skins	I
Colobus angolensis	U.K.	Kenya	1 skin	I
Colobus guereza	Switzerland	Canada	1 garment	I/E
	Switzerland	West Germany	14 skins	I/E
	Switzerland	Spain	3 garments	I
	Switzerland	Italy	1 garment	I
	West Germany	Canada	1 garment	E
	Hong Kong	Canada	3 garments	E
	U.S.A.	Canada	48 skins	I
	U.S.A.	Canada	8 garments	E
Colobus polykomos	Argentina	U.K.	80 skins	E
	Canada	South Africa	1 skin	E
	U.K.	Kenya	1 skin	I
	Hong Kong	Canada	1 garment	E
	U.S.A.	Canada	1 garment	I
Erythrocebus patas	U.S.A.	Canada	4 scraps	E
	U.S.A.	Canada	4 skin scraps	E
Macaca fascicularis	Canada	U.S.A.	110 specimens	E
Macaca mulatta	Switzerland	France	1 body	I
Papio spp.	U.S.A.	Botswana	6 trophies	I
	U.S.A.	Namibia	1 trophy	I
	U.S.A.	South Africa	1 trophy	I
	U.S.A.	Zambia	4 trophies	I
	U.S.A.	Zaire	1 trophy	I

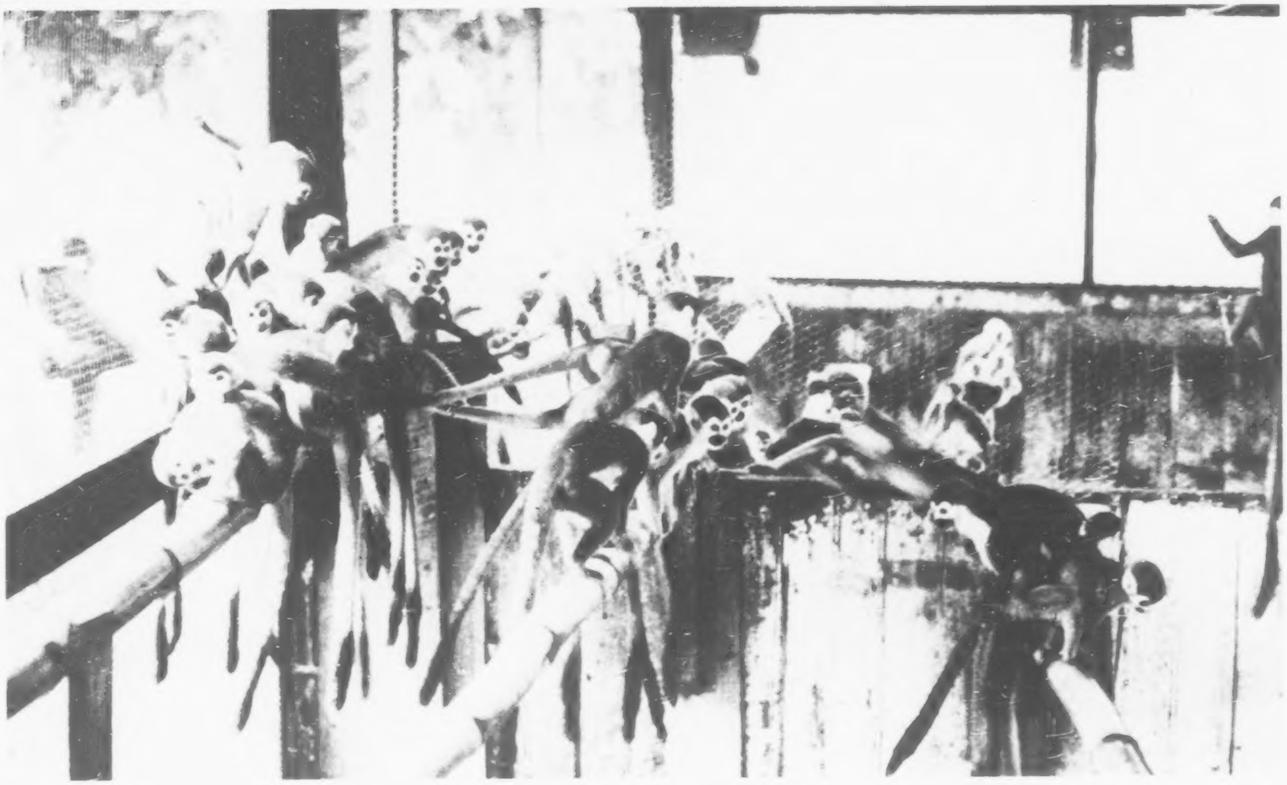
TABLE 38 (cont.)

SPECIES	IMPORTER	EXPORTER	ITEMS	REPORTED BY
Papio cynocephalus	Switzerland	France	1 skull	I
	U.S.A.	Central African Republic	6 trophies	I
	U.S.A.	Namibia	1 trophy	I
	U.S.A.	South Africa	7 trophies	I
Papio papio	U.K.	South Africa	2 trophies	I
Papio ursinus	Austria	South Africa	1 skull	E
	Switzerland	Namibia	6 bodies	I
	Switzerland	Namibia	3 skulls	I
	U.S.A.	Botswana	11 trophies	I
	U.S.A.	Malawi	1 trophy	I
	U.S.A.	Namibia	1 skin	I
	U.S.A.	South Africa	2 trophies	I
	U.S.A.	South Africa	4 skins	E
	U.S.A.	South Africa	6 skulls	E
	U.S.A.	South Africa	1 specimen	E
	U.S.A.	South Africa	4 trophies	E

Note: See Table 3 for interpretation

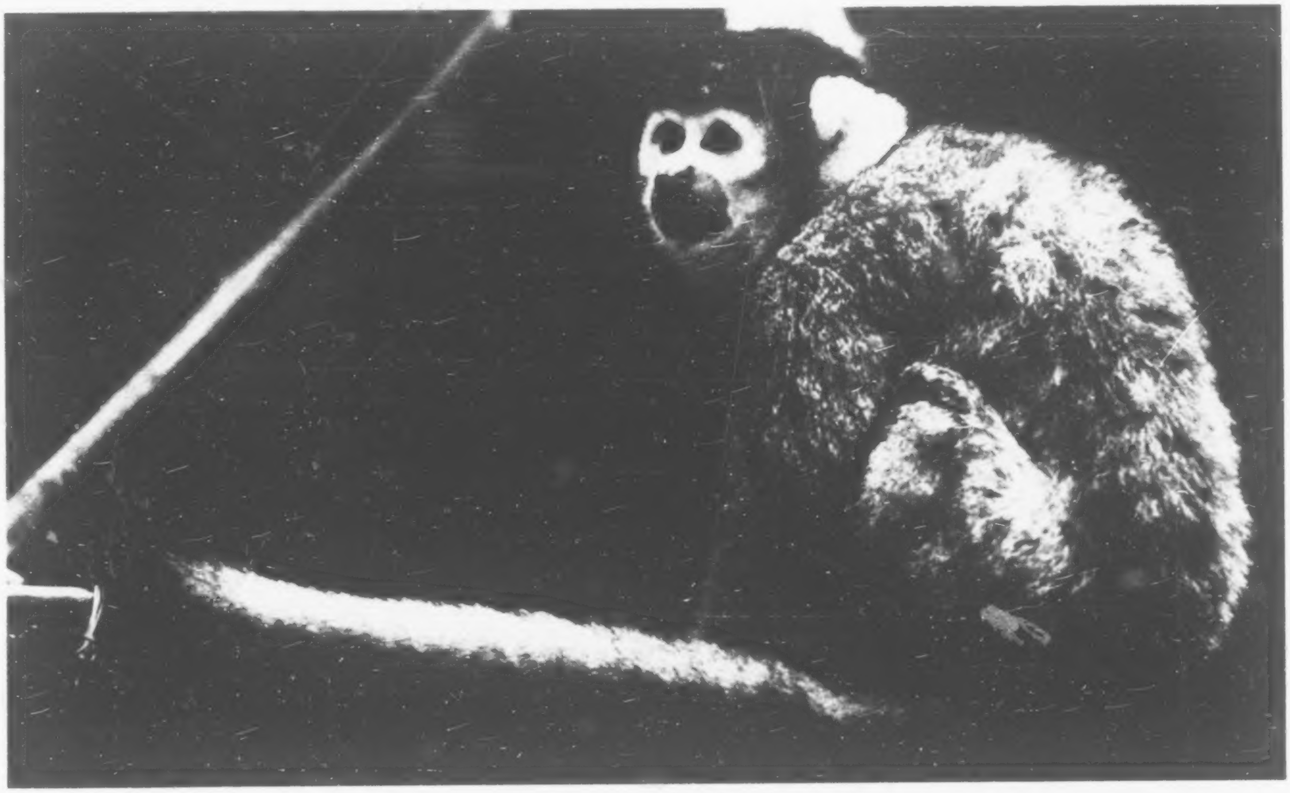
Source: National CITES reports in WTMU files (June, 1982).

[1] The genus *Aotus* was recently divided into 9 separate species (Hershkovitz, 1983)



Above: Squirrel monkeys from the Amazon region of northern South America being held in a dealer's compound in Leticia, Colombia in 1972. Squirrel monkeys were imported into the U.S. by the tens of thousands in the 1960's, for the pet trade and for research (photo by R. A. Mittermeier)

Below: The Bolivian squirrel monkey, which continued to be exported to the U.S. until the imposition of a one-year Bolivian export ban in May, 1984 (photo by R. A. Mittermeier)



A Review of the U.S. Primate Trade

David Mack
and
Ardith Eudey

I. Introduction

This chapter analyzes the U.S. primate trade between 1964 and 1980. Emphasis is placed on the most recent five-year period, 1976 through 1980, during which new sources of information became available.

The United States has been the principal importer and user of primates in the 20th century. Information compiled by U.S. government agencies suggests that primates were imported into the U.S. during this period primarily for biomedical and behavioral research and industrial use, and to a lesser extent for pets and exhibitions.

In 1901, the U.S. Bureau of Biological Survey began to compile a record of exotic wildlife imports, including primates. These records are summarized by Banks (1976). Mammal imports increased sharply between 1910 and 1914, apparently as a result of a large number of monkeys being imported for "laboratory and pathological experiments" (Banks, 1976: 12). Primates did not become the principal mammalian import into the United States, however, until after 1932. At least 87,119 rhesus monkeys (*Macaca mulatta*) were imported between 1931 and 1940, accounting for over 90% of all mammalian imports during the period (Banks, 1976).

The peak of primate imports into the United States occurred during the latter half of the 1950's. Between 1956 and 1960, almost 600,000 rhesus monkeys were imported by the United States (Conway, 1965). During the period 1968 through 1972, primates, excluding tree shrews (*Tupaia glis*), constituted 458,588 (87%) of the total 526,475 mammals imported into the United States (Banks, 1976); imports of rhesus monkeys and squirrel monkeys (*Saimiri sciureus*) totalled 127,004 and 173,049 respectively. Squirrel monkeys were imported for both biomedical use and the pet trade.

By 1980, the number of primates imported into the United States had declined to 22,371 (Table 1). Factors contributing to this reduction include the imposition of bans or quotas by exporting countries and the prohibition of the importation of primates as pets by the U.S. Public Health Service.

II. U.S. Legislation Affecting Primate Trade

The following acts and regulations are an important background to the history of primate trade in the United States.

A. Lacey Act

In 1900, the U.S. Congress passed the Lacey Act, one of the first federal laws relating to wildlife and its protection. The original intent of the Lacey Act was to prevent the establishment of exotic species in the United States. Accordingly, the first version of the Lacey Act made it illegal to import almost all wild birds, mammals, and reptiles without a permit. Shortly after promulgation of the Lacey Act, primates appear to have been exempted from permit requirements. Instead, those animals entering the U.S. without permit were supposed to be declared at Customs ports of entry.

Today, the Lacey Act includes a statute which makes it illegal for any animal to be brought into the U.S. that has been taken in violation of another country's laws (Section 43). It is also illegal to ship wild animals to the U.S. under inhumane or unhealthful conditions (Section 42). The presence of a substantial ratio of dead, crippled, diseased, or starving animals will be deemed prima facie evidence of such violation. Another statute requires containers of most animals to have the names of shipper and consignee and contents of the container by number and kind clearly marked on the outside (Section 44).

B. Endangered Species Conservation Act of 1969

The Endangered Species Conservation Act of 1969 (Title 16, United States Code, Subsections 668aa - 668cc-5) was enacted to prevent the importation of endangered wildlife into the United States. The Act specifically recognizes that both habitat destruction and over-utilization for commercial or sporting purposes may contribute to a species' extinction. The Secretary of the Interior was charged with listing endangered species in the *Federal Register* and with reviewing such lists at least once every five years. In 1970, 26 primates, including all prosimian genera, were listed as endangered (see Appendix A).

C. Endangered Species Act of 1973

The Endangered Species Act of 1973 (Title 16, United States Code, Sections 1531 - 1543) grew out of the Endangered Species Conservation Act of 1969. The 1973 Act set up a procedure for permit applications by which the importation of endangered species was limited to scientific research or to enhancing the propagation or survival of endangered wildlife. The Act also established a category of threatened wildlife in an attempt to regulate activities that may be detrimental to the survival of the species so listed. In 1976, an additional 21 primates were listed as endangered and 12 were listed as threatened (see Appendix A).

D. Convention on International Trade in Endangered Species (CITES)

The United States was the first country to ratify the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The Convention, which came into force in July 1975, attempts to protect species of wild animals and plants against over-exploitation through international trade (see Kavanagh and Bennett, this volume). The U.S. implements CITES through the Endangered Species Act of 1973.

In recognition of the vulnerability of primates to the effects of uncontrolled trade, all primate species appear on either CITES Appendix I or Appendix II. There is considerable overlap between the species listed on CITES Appendix I and the U.S. list of endangered species (see Kavanagh and Bennett, this volume).

E. Code of Federal Regulations 50, Wildlife And Fisheries

Under the Code of Federal Regulations 50, Wildlife and Fisheries, Part 13, General Permit Procedures (as revised in 1965), imports of live wild mammals, including primates, for commercial, scientific, exhibition, or propagation purposes are allowed only upon filing a written declaration at the port of entry where the inspection occurs. According to Banks (1976), this regulation became effective January 1, 1966. Importers, or their brokers, are required to file a Declaration of Importation for Wildlife form 3-177. Since 1972, the Fish and Wildlife Service has taken on responsibility for inspection of all wildlife imports. There are currently nine designated ports of entry where wildlife can enter the U.S.

A regulation added to Code of Federal Regulations 50, Wildlife and Fisheries, Part 14 (Importation, Exportation, and Transportation of Wildlife), effective September 1980, requires a completed Declaration for Exportation of Wildlife form 3-177 to be filed with the Fish and Wildlife Service prior to export. The regulation provides an exemption for wildlife valued under $250 and not intended for sale (i.e., personal household effects).

F. Code of Federal Regulations 42, Public Health

In 1975, the U.S. Public Health Service of the Department of Health and Human Services amended Code of Federal Regulations 42 (Public Health, Part 71, Foreign Quarantine) by establishing a new Subpart J-3 (Importation of Nonhuman Primates). This amendment prohibits the importation of primates into the United States except for scientific or educational purposes or for exhibition. The rule eliminates the import of primates for the pet trade because of possible human health hazards. In addition, the regulation establishes a system of post-importation health surveillance. Importers are required to maintain standardized shipment records with information on numbers of primates, country of origin, species, date of importation, dates of transfers to other persons or organizations, and incidence of mortality and disease. This information is recorded on Center for Disease Control Primate Import Document 4.487B 8-75.

III. Data Sources Used in this Report

A. Customs Statistics

Since 1964, the Bureau of the Census (U.S. Department of Commerce) has compiled total numbers of primates imported into the United States as collected by the Customs Service (U.S. Department of Treasury) (Table 1). Data include total number of primates imported by country of origin and their declared value. These statistics are published monthly in *Tariff Schedules of the United States Annotated (TSUSA), Number by Unit Controlled by Country of Origin* (IM 146), and annually in *U.S. Imports for Consumption and General Imports* (FT 246). Shipments of primates valued at less than $250 are not recorded by the U.S. Customs Service.

B. Wildlife Leaflets

Between 1967 and 1972, the U.S. Fish and Wildlife Service published annual *Wildlife Leaflets*, which summarize total numbers of wildlife imported by the United States. The data were tabulated from Declaration of Importation forms 3-177. For the period 1968 - 1972, a series of five reports on annual imports of live mammals, including primates, was prepared (Jones, 1970; Jones and Paradiso, 1972; Paradiso and Fisher, 1972; Clapp and Paradiso, 1973; and Clapp, 1974). Between 1968 and 1970, imports were identified by family and species, but for 1971 and 1972, country of export also was included. The U.S. Fish and Wildlife Service did not publish an analysis of wildlife imports again until 1978 (see below).

C. CITES Reports

As an obligation to CITES, all Parties must submit annual reports summarizing trade in species listed on the CITES Appendices. In the United States, CITES annual reports for 1977 through 1979 are based on analysis of CITES permits issued by the United States and foreign countries. Beginning in 1980, data in U.S. CITES annual reports have been compiled from CITES permits, supplemented with information on U.S. Fish and Wildlife Service 3-177 import/export forms. The U.S. report is compiled by the Wildlife Permit Office of the Fish and Wildlife Service, U.S. Department of the Interior. While information from CITES reports are not used in the present chapter, discrepancies in primate imports for the year 1979 among four data sources (CITES reports, Customs, published statistics, 3-177 Declaration of Importation documents, and Center for Disease Control primate import forms) are analyzed in Appendix B.

D. U.S. Fish and Wildlife Service Import Documents

Tabulation of the numbers of each primate species imported into the United States during the period 1976 to 1980 has been made possible by data obtained from U.S. Fish and Wildlife Service 3-177 import forms (Tables 2 and 3). Imports on 3-177 import forms for the year 1976 were analyzed by Shirley McGreal for the International Primate Protection League (McGreal, 1977; Anon., 1978a). Between 1977 and 1980, 3-177 import forms were analyzed by Mack from documents obtained by Shirley McGreal and TRAFFIC (U.S.A.) under a Freedom of Information Act request to the U.S. Fish and Wildlife Service. Supplemental information on primate imports for fiscal year 1976 (October 1975 to September 1976) and calendar years 1978 and 1979 were obtained from Center for Disease Control Primate Import documents (see below).

E. U.S. Center for Disease Control Primate Import Documents

Since 1975, importers of primates have been required to fill out Center for Disease Control Primate Import Document 4.487B 8-75. U.S. government agencies or facilities are not required to fill out this document. A computer printout of importations enumerated by species and exporting country for the fiscal year 1976 (October 1975 - September 1976) produced by the Center for Disease Control in Atlanta appears to be the only analysis of these data.

Under a Freedom of Information Act request, TRAFFIC (U.S.A.) and the International Primate Protection League were able to obtain copies of these forms for the years 1978 and 1979. Information from these documents is analyzed by Eudey, with the assistance of Dr. Young G. Koh, and is presented in Tables 4, 5, and 6.

F. Other Sources

Additional analysis of the volume of trade and use of primates in the U.S. appear in *Wildlife Importation into the United States, 1900-1972* (Banks, 1976), *Conference Reports: the Availability and Long Term Supply of Primates for Medical Research* (Conway, 1965), *Conservation of Nonhuman Primates in 1970* (Harrisson, 1971), *Nonhuman Primates: Usage and Availability for Biomedical Programs* (Muckenhirn, 1975), and the *National Primate Plan* (Interagency Primate Steering Committee, 1978).

For purposes of this report, tree shrews (*Tupaia glis*, Family Tupaiidae), are treated as primates to follow U.S. government policy which classifies tree shrews as primates. The ordinal classification of this species is still debated (see Luckett, 1980; Eisenberg, 1981).

IV. U.S. Primate Trade: 1964-1980

According to U.S. Customs Service statistics, the U.S. imported 1,178,337 primates between 1964 and 1980 (Table 1). Almost 62% (729,716) of these were imported during the seven-year period 1964-1869, The number of primates imported ranged from a high of 126,857 in 1968 to a low of 90,743 in 1970, and the annual average was 104,245. The total number of primates imported during the following decade (1971-80) declined to 448,621 (Table 1): the number of primates imported annually ranged from a high of 79,846 in 1971 to a low of 22,371 in 1980 (the last year for which data are provided in this report). The annual average during this ten-year period was 44,862. Customs statistics record a steady decline in the total number of primates imported over the entire seventeen-year period (Table 1).

The U.S. imported primates from at least 58 countries between 1964 and 1980 (Table 1). Most imports came from countries in South and Central America and the Caribbean, accounting for 561,029 or 47.6% of all primate imports, imports from Asia ranked second, totalling 494,186 or 41.9% of all imports. Africa followed with 116,059 or 9.9% of all imports, and Canada and Europe ranked last with 5,026 or 0.4% of the total.

Prior to 1967, imports from the Neotropical countries approximated those from Asia, with both regions contributing over 40% of total primate imports. During the subsequent six-year period, 1967 to 1972, Neotropical imports rose to 60% of all imports, while Asian imports declined to 33%. Asian and New World primate imports again approximated each other in 1973, but since 1974, Asia has been the principal supplier, accounting for 65% of total U.S. imports during 1974 to 1980, while Neotropical imports declined to 20% during the same period. African primate imports averaged about 10% of total imports for the entire 17-year period although they rose to between 13% and 17% beginning in 1974. European and Canadian imports have infrequently exceeded 1% of total imports during any given year.

Of the 1,178,337 primates imported into the Unites States from 1964 to 1980, 1,115,405 or 94.7% were obtained from 13 countries, each contributing 1% (0.96%) or more to the total number imported. Total imports from these countries are summarized below:

Country of Origin	Quantity (1964-1980)	Percent of Total Imports
Asia		
India	332,197	28.2
Malaysia	40,533	3.4
Philippines	36,695	3.4
Thailand	32,705	2.8
Indonesia	23,884	2.0
Pakistan	11,862	1.0
Africa		
Kenya	37,172	3.2
Ethiopia	36,523	3.1
Somalia	24,034	2.0
Neotropics		
Peru	364,445	30.9
Colombia	138,640	11.8
Bolivia	22,361	1.9
Guyana	11,354	1.0

Three of the countries, Peru, India, and Colombia, accounted for 835,282 or 70.9% of all primates imported into the U.S. during the seventeen-year period. All three countries imposed bans on primate exports during the 1970's (see country synopsis), and as a result, fewer primates were imported by the United States. There was, however, an increase in the numbers imported from other countries in the same regions: Bolivia, Guyana, and Paraguay in the Neotropics, and Indonesia, Malaysia and the Philippines in Asia (Table 1).

In 1980, the latest year discussed in this study, the U.S. imported a total of 22,371 primates from 21 countries (Table 1). Nine countries contributed 1% or more to the 1980 imports, accounting for 93.2% of the total. Of these, the Philippines, Indonesia, and Bolivia supplied 15,493 or 69.3% of all imports.

V. Primate Species Imported into the United States

A. 1968 to 1972

According to data derived from U.S. Fish and Wildlife Service 3-177 forms, 461,254 primates entered the U.S. between 1968 and 1972, representing at least 107 species (Table 2). Neotropical primates, including 21 species of the family Cebidae and 17 species of the family Callitrichidae, accounted for 283,776 or 61.5% of total imports. Asian members of the family Cercopithecidae, including 10 species of the sub-family Cercopithecinae and 9 species of the sub-family Colobinae, accounted for 145,357 or 31.5% of the total. African members of the family Cercopithecidae, including 22 species of the sub-family Cercopithecinae and 2 species of the sub-family Colobinae, accounted for 25,792 or 5.6% of the total. All other primates, including apes (Hylobatidae and Pongidae) and prosimians (Lemuridae, Tarsiidae, and Indriidae), tree shrews (Tupaiidae), and unknown species accounted for only 6,329 or 1.4% of total imports.

Of the 107 primate species imported between 1968 and 1972, the 13 species listed below contributed 1% or more to the 461,254 total imports, accounting for 429,805 or 93.3% of all primate imports:

Species	QUANTITY IMPORTED (1968-1972)	Percent of Total
Callitrichidae		
Saguinus oedipus	13,711	3.0
Saguinus nigricollis	9,135	2.0
Cebidae		
Saimiri sciureus	173,049	37.5
Aotus trivirgatus[1]	20,869	4.5
Cebus albifrons	17,823	3.9
Lagothrix lagotricha	12,808	2.8
Ateles geoffroyi	7,981	1.7
Cebus capucinus	7,448	1.6
Cebus apella	6,666	1.5
Cercopithecidae		
Macaca mulatta	127,004	27.5
Cercopithecus aethiops	18,536	4.0
Macaca fascicularis	8,058	1.8
Macaca arctoides	6,717	1.5

[1] The genus *Aotus* was recently divided into 9 separate species (Hershkovitz, 1983).

Imports of eight other species totalled more than 1,000 each, including *Tupaia glis*, *Saguinus mystax*, *Cebuella pygmaea*, *Ateles paniscus*, *Macaca nemestrina*, *Papio anubis*, *Theropithecus gelada*, and *Pan troglodytes* (Table 2). For 1971 and 1972, the Fish and Wildlife Service reports provide a breakdown of all species imported by country of export (see Table 3).

B. 1976 to 1980

The number of primates imported into the U.S. declined from 461,254 between 1968 and 1972 to 139,685 between 1976 and 1980 (Table 2). Also, the number of species imported decreased from 107 to approximately 79 during the two five-year periods (Table 2). Neotropical primates, including 16 species of the family Cebidae and 15 species of the family Callitrichidae, accounted for 29,336 or 21.0% of total imports between 1976 and 1980. Asian members of the family Cercopithecidae, including eight species of the sub family Cercopithecinae and five species of the sub family Colobinae, accounted for 84,490 or 60.5% of the total. African members of the family Cercopithecidae, including 16 species of the sub family Cercopithecinae and three species of the sub family Colobinae, accounted for 20,147 or 14.4% of the total. The relative contributions of the major taxomomic groups to primate imports into the U.S. are compared for 1968-1972 and 1976-1980 in Table 2.

Between 1976 and 1980, ten species (including the tree shrew, *Tupaia glis*) contributed 1.0% or more to the total imports, accounting for 128,623 or 92.1% of all imports. These species are listed below:

Species	QUANTITY IMPORTED (1976-1980)	Percent of Total
Tupaiidae		
Tupaia glis	4,389	3.1
Callitrichidae		
Saguinus labiatus	4,296	3.1
Saguinus mystax	1,683	1.2
Saguinus oedipus	1,669	1.2
Cebidae		
Saimiri sciureus	12,512	9.0
Aotus trivirgatus[1]	3,300	2.4
Cercopithecidae		
Macaca fascicularis	54,168	38.8
Macaca mulatta	27,340	19.6
Macaca nemestrina	1,540	1.1
Cercopithecus aethiops	13,238	9.5
Papio anubis	4,468	3.2

[1] The genus *Aotus* was recently divided into 9 separate species (Hershkovitz, 1983).

Macaca fascicularis increased from the ninth-most numerous primate imported in 1968 to 1972 to the principal species imported for 1976 to 1980 (Table 2). *Macaca mulatta* remained the second-most frequently imported primate, but imports of this species decreased from 127,004 in 1968-1972 to just 27,340 in 1976-1980. *Saimiri sciureus* fell in the rankings from the species most often imported in 1968 to 1972 to fourth position in 1976 to 1980.

For 1976 to 1980, data recorded on FWS 3-177 forms provide numbers of each primate species imported into the U.S. by country of export/origin. This information is summarized in Table 3.

VI. Regional Synopsis

For the period 1964 to 1980, data collected from the U.S. Customs Service (Table 1) and the U.S. Fish and Wildlife Service (Table 3) identify trade routes of primates to the United States. Kavanagh and Bennett (this volume) elaborate on the regulations and laws affecting the export of primates to which reference is made in this section.

A. Asia

Asia accounted for almost 42% of the 1,178,337 primates imported into the U.S. from 1964 to 1980, and was second only to the Neotropical region (Table 1). Over 28% (332,197) of all primates imported during this period were acquired from India alone. Since 1973, Asia has been the major supplier of primates to the U.S. The rhesus monkey (*Macaca mulatta*) was the species most frequently imported from Asia. Over 90% was supplied annually by India (Table 3), until it banned the export of primates in 1978. Since then, increased numbers of long-tailed macaques (*Macaca fascicularis*) from Indonesia, the Philippines, and Malaysia have entered the U.S.

Bangladesh. In 1973, Bangladesh banned the capture, possession, and trade of all primates with the exception of the rhesus monkey. In 1976, the U.S. imported 1,043 rhesus monkeys from Bangladesh, and the following year none was imported (Table 3). In March 1977, the government of Bangladesh entered into an agreement with MOL Enterprises, of Portland, Oregon, by which the company was awarded an exclusive franchise to export primates from Bangladesh. The terms of the agreement would have permitted the export of over 70,000 rhesus monkeys during a ten-year period. In 1978, the National Institutes of Health received 862 Bangladesh rhesus monkeys from MOL Enterprises, and 240 in 1979 (Interagency Primate Steering Committee, in litt., 1980).

In January 1979, the agreement with MOL Enterprises permitting the export of rhesus monkeys was terminated by the Bangladesh government for non-fulfillment of obligations. The Bangladesh government accused MOL Enterprises of failing to establish a captive-breeding facility. Since April 1979, the U.S. Department of State appears to have made efforts to pressure the government of Bangladesh to reinstate its contract with MOL Enterprises (Heneson, 1982), although evidence indicates that Bangladesh's rhesus monkeys would not be able to withstand the heavy cropping proposed in the 1977 agreement.

India. In 1955, the U.S. and India entered into an agreement permitting the export of rhesus monkeys from India to the U.S. for use in the development and testing of polio vaccine and in other medical research. Between 1956 and 1960, the U.S. annually imported an average of 120,000 rhesus monkeys from India (Conway, 1965). Subsequently, India established an export quota of 50,000 rhesus monkeys annually. In the province of Uttar Pradesh, the only area for which data on population trends are available, intensive trapping for export had caused a conspicuous change in the age structure of rhesus populations, with juvenile macaques experiencing the largest decline (Southwick *et al.*, 1970). In 1973, India announced a reduction in the export quota to 30,000 rhesus monkeys annually, and the following year the number was reduced further to 20,000. As early as 1976, at the Sixth Congress of the International Primatological Society in Cambridge, England, Indian primatologists called for a moratorium on the export of rhesus monkeys to permit an assessment of the status of populations throughout India.

During the period 1964 to 1978, the U.S. imported a total of 332,000 primates from India (Table 1), of which more than 99% were probably rhesus monkeys. In December 1977, India declared a ban on the export of all primates to go into effect in April 1978. The Indian government cited the U.S. as having breached the terms of the 1955 agreement by using rhesus monkeys in defense-related research (Wade, 1978).

Indonesia. As a consequence of export bans by India and Bangladesh on rhesus monkeys, the U.S. has increased its use of long-tailed macaques (*Macaca fascicularis*) from Southeast Asia. The increase in long-tailed macaque imports actually began in 1974, following the reduction of worldwide exports of rhesus monkeys by India. For many types of medical research and industrial production and testing, long-tailed macaques have successfully replaced rhesus monkeys (Held, 1982).

U.S. primate imports from Indonesia rose from less than 300 annually prior to 1974 to an average of 1,358 annually for the period 1974 to 1977 and to over 5,000 annually since 1978 when the Indian ban went into effect (Table 1). Between 1976 and 1980, the U.S. imported almost 19,000 long-tailed macaques and 570 pig-tailed macaques (*Macaca nemestrina*) from Indonesia (Table 3). In 1978 and 1979, Indonesia was the principal supplier of long-tailed macaques to the U.S., but was replaced as the major supplier in 1980 by the Philippines.

In September 1979, a shipment of approximately 300 long-tailed macaques from Indonesia arrived in Sweden with a high percentage of dead and dying monkeys (van den Hoorn, 1979). This prompted Indonesia to temporarily suspend export permits for long-tailed macaques, pig-tailed macaques, and silvered leaf monkeys (*Presbytis cristata*) in February 1980 (Anon, 1980a). The suspension appears to have been short-lived, however, as Indonesian long-tailed macaques entered the U.S. in every month during 1980.

Malaysia. During 1964 to 1980, the U.S. imported over 40,000 primates from Malaysia (Table 1). From 1964 to 1972, imports from this country averaged 1,640 annually. Imports climbed from 2,301 in 1973 to 3,547 in 1977, and reached a peak of 5,888 in 1978, when the Indian export ban on rhesus monkeys went into effect. During the 1970's, Malaysia was a major supplier of long-tailed macaques to the U.S. and from 1977 to 1979 the principal supplier of pig-tailed macaques (Table 3).

In mid-1979, Malaysia imposed a two-year suspension on the capture and export of macaques, honoring only outstanding trapping permits. In February, 1980, however, limited export of macaques was resumed on application only, for "bona fide scientific research and development of humanity" (Nordin and Hasnah Samian, 1981). As a result, imports of Malaysian long-tailed macaques by the U.S. declined to 810 in 1980, and there were no imports of pig-tailed macaques during that year. Primate exports for biomedical research have been confined to Peninsular Malaysia and are non-existent from the states of Sabah and Sarawak, primarily because of stringent wildlife laws (Nordin and Hasnah Samian, 1981). Malaysia has now proposed a total ban on primate exports to go into effect on June 15, 1984 (Anon., 1983).

Pakistan. From 1964 to 1971, Pakistan supplied the U.S. with almost 12,000 primates (Table 1), probably all rhesus monkeys. Soon after, Pakistan banned the export of rhesus monkeys. Pakistan's National Council for the Conservation of Wildlife reaffirmed this ban after India's export ban became effective in 1978 (A. Richard, in litt., 1979). No monkeys have entered the U.S. from Pakistan since at least 1975 (Tables 1 and 3).

Philippines. From 1964 to 1967, the U.S. imported over 13,200 primates from the Philippines (Table 1), of which most were probably long-tailed macaques. During the next five years, only 1,615 came from the Philippines. Since 1973, however, there has been a steady increase of primate imports from the Philippines (Table 1). Over half of the 13,174 long-tailed macaques imported into the U.S. in 1980 were from the Philippines (Table 3), making it the largest exporter of primates to the U.S. during that year.

Singapore. The total number of primates imported by the United States from Singapore in the early 1970's is not known as there is considerable discrepancy between Customs Service statistics (Table 1) and those of the Fish and Wildlife Service (Table 3). From 1971 to 1972, the FWS reports 303 primates imported from Singapore (Table 3), including 125 siamangs (*Hylobates syndactylus*) and 81 gibbons (*Hylobates* spp.). With the possible exception of 18 long-tailed macaques, none of these primates are native to Singapore, which is known to have been re-exporting wild animals illegally taken from other countries in Southeast Asia and the Pacific (Anon. 1976). In 1976, the government of Singapore, in response to a campaign conducted by the International Primate Protection League, took measures to guarantee that only legitimate wildlife shipments would be re-exported or transshipped by requiring an export permit from the country or origin.

The actions taken by Singapore and the listing of the siamang and gibbons on CITES Appendix I in 1975 and on the U.S. Endangered Species Act list in 1976, contributed to the end of trafficking in these primates to the United States. Importations of primates to the U.S. from Laos, which exported gibbons and other primates illegally obtained from Thailand (Anon., 1978b), also ceased after 1975 (Tables 1 & 3). Between 1968-1972 and 1976-1980, the total number of gibbons imported into the U.S. declined from 753 to 7 (Table 2).

Thailand. During the period 1964 to 1976, the U.S. imported almost 30,000 primates from Thailand (Table 1). Most were probably macaques, especially the stumptail macaque (*Macaca arctoides*), although rhesus monkey imports may have increased significantly in 1974 when India reduced exports of the species (Eudey, 1978). Thailand supplied more than 90% of the 2,883 stumptail macaques imported by the U.S. in 1971 and 1972 (Table 3).

In 1975, Thailand imposed a ban, effective in April 1976, on the commercial export of macaques (*Macaca* spp.), leaf monkeys (*Presbytis* spp.), and the slow loris (*Nycticebus coucang*). This ban virtually eliminated stumptail macaques from international traffic. In 1979, the U.S. imported ten slow loris from Thailand as a zoo exchange, but in 1980 seven lorises were imported into the U.S. by a commercial dealer, in apparent violation of Thailand's laws (Table 3). In 1980, Thailand's Royal Forest Department authorized export of 24 rhesus macaques (Table 3), which had been obtained from India by a medical facility of the U.S. Army in Bangkok (W. Nanakorn, pers. comm., 1981).

Gibbons (*Hylobates* spp.) have been protected from commercial exploitation in Thailand since 1961. In 1973 and 1974, the International Primate Protection League, in cooperation with government agencies in Thailand and the U.S., obtained documentation of irregular and illegal shipments of white-handed gibbons (*Hylobates lar*) between the two countries. Importation of two commercial shipments, part of a large order placed by an American laboratory, was routed through Canada, which at the time had no laws or regulations to protect foreign wildlife (Anon., 1980c). There were no prosecutions by U.S. authorities although the shipments were in apparent violation of Section 43 of the U.S. Lacey Act.

Since 1976, the only primate species legally exported commercially from Thailand is the tree shrew (*Tupaia glis*). During the period 1976 to 1980, the U.S. imported over 4,300 from Thailand (Table 3). In December 1980, the Cabinet of Thailand added this species to the list of protected wild animals and banned its export because of excessive mortality during shipping (Anon, 1980b). In June, 1981, a shipment of 100 tree shrews, with 44 dead, was received in the U.S. (S. McGreal, in litt., 1981), and none have since been exported from Thailand.

B. Africa

Imports from Africa accounted for almost 10% of the 1,178,337 primates imported into the U.S. during 1964 to 1980 and ranked third in total imports behind the Neotropics and Asia respectively (Table 1). The percentage of primates imported by the U.S. from Africa increased after 1974. This increase appears to be the result of the decline in primate imports from the Americas following the 1973 and 1974 export bans imposed by Peru and Colombia, respectively, and not a result of increased primate exports by African nations. In 1978 and 1979, the numbers of primates imported from Africa were greater than those from the Neotropics. For the entire period, 1964 to 1980, Kenya, Ethiopia, and Somalia supplied over 84% of all primates imported from Africa by the U.S. (Table 1).

Green monkeys (*Cercopithecus aethiops*) and baboons (*Papio* spp.) appear to be the major African species imported by the U.S., although gelada baboons (*Theropithecus gelada*) and chimpanzees (*Pan* spp.) were significant imports prior to the mid-1970's (Tables 2 & 3). Nigeria annually supplied approximately 450 patas monkeys (*Erythrocebus patas*) to the U.S. between 1976 and 1980 (Table 3). Galagos, especially *Galago senegalensis*, were imported in large numbers for the pet trade before the U.S. Public Health Service prohibited such traffic in 1975.

Chimpanzee imports by the U.S. declined from 1,171 in 1968-1972 to 194 in 1976-1980 (Table 2). The decrease may be attributed to export bans imposed by habitat countries and the listing of the chimpanzee on CITES Appendix I and the U.S. Endangered Species Act in the mid-1970's (see Appendix A). From 1971 to 1972, Liberia exported 196 chimpanzees to the U.S. and Sierra Leone exported 220 (Table 3). Sierra Leone exported 689 chimpanzees to the U.S. from 1973 to 1979 (Teleki, 1980) before it became the last country to ban such exportation under Presidential Decree in 1979.

Ethiopia. During the period from 1964 to 1980, the U.S. imported more than 36,500 primates from Ethiopia (Table 1). Imports from this country gradually declined from about 5,600 in 1968 to fewer than 200 in 1980. Since at least 1971, the major export to the U.S. has been green monkeys and, to a lesser extent, baboons (*Papio* spp.) (Table 3). From 1971 to 1972, over 38% of the green monkeys imported by the U.S. came from Ethiopia. Subsequent imports from Ethiopia fluctuated in numbers and in 1980 represented less than 6% of all green monkey imports (Table 3).

Kenya. The U.S. imported over 37,000 primates from Kenya from 1964 to 1980 (Table 1). Since at least 1971, the species most often imported has been the olive baboon (*Papio anubis*) (Table 3). From 1976 to 1980, Kenya supplied more than 93.5% of all olive baboons to the U.S. The country also has been a major supplier of green monkeys to the U.S., supplying over 44% of the species imported by the U.S. between 1976 and 1980 (Table 3).

The U.S. is reported to have imported 105 red colobus monkeys (*Colobus badius*) from Kenya between 1976 and 1978 (Table 3). The species may have been misidentified as it is unlikely that these monkeys could have been captured from the small populations of red colobus monkeys remaining in Kenya (J. Oates, in litt., 1980).

In July, 1981, Kenya banned all exports of primates (Anon., 1981a), but this action was subsequently reversed (Held, 1982).

Somalia. From 1964 to 1980, the U.S. imported over 24,000 primates from Somalia, with annual numbers ranging from more than 3,000 in 1966 to approximately 500 in both 1976 and 1977 (Table 1). Green monkeys were the major export, and from 1978 to 1980, Somalia supplied more than half of all green monkeys imported by the U.S. (Table 3).

At the Third Meeting of the Parties to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) in February 1981, Mr. Usuf Mohammed Ahmed, Manager of Wildlife Reserves in Somalia, brought the country's wildlife laws to the attention of participants and expressed concern about illegal trade from Somalia (Conference Document, Inf. 3.10). The hunting or trapping of the green monkey was prohibited in 1971, and thus all green monkeys imported from Somalia to the U.S. since that date appear to be in violation of the U.S. Lacey Act. No Somalian green monkeys entered the U.S. between January and June of 1981 (TRAFFIC-U.S.A., unpublished data). The same year, a survey of primates determined that green monkeys are widespread in all southern woodlands of Somalia, although some commercial over-exploitation may occur locally. As a result, in December, 1981, the Somalian government authorized the annual export of 1,000 green monkeys over a five-year period (Dr. Abdullahi Ahmed Karani, in litt., 1981). At the end of this term, the quota will be re-examined.

C. The Neotropical Region

The Neotropics accounted for over 47% of the 1,178,337 primates imported from 1964 to 1980 (Table 1), and was the principal supplier of primates to the United States. Peru and Colombia alone supplied 503,085, or 90% of all primates imported from the Neotropics during the period. Peru banned the commercial export of primates in 1973 and Colombia banned trade in primates the following year. As a result of these bans, the region dropped from being the largest supplier to second place behind Asia. Bolivia, Guyana, and Paraguay became the major exporters of primates to the U.S. following the Peruvian and Colombian bans (Table 1).

Squirrel monkeys (*Saimiri sciureus*) dominated imports from South American countries during the late 1960's and early 1970's, but declined significantly following the U.S. Public Health Service ban on pet primate imports in 1975 (Tables 2 and 3). The 1975 pet ban also reduced the trade in many other Neotropical primate species including marmosets (*Callithrix* spp.), tamarins (*Saguinus* spp.), night monkeys (*Aotus* spp.), titi monkeys (*Callicebus* spp.), capuchins (*Cebus* spp.), spider monkeys (*Ateles* spp.), and woolly monkeys (*Lagothrix lagotricha*).

In the 17th century, African green monkeys (*Cercopithecus aethiops*) were introduced and became established on the Caribbean islands of St. Kitts, Nevis, Anguilla, and Barbados. Since at least the early 1970's, several hundred have been exported from these islands to the U.S. (Table 3).

Bolivia. Prior to primate export bans by Peru and Colombia in 1973 and 1974, respectively, the U.S. imported only 700 monkeys from Bolivia (Table 1). Following the bans, Bolivia immediately became the largest exporter of New World primates, shipping an average of 3,094 primates annually from 1974 to 1980. Between 1976 and 1980, Bolivia supplied 944 or 29% of all night monkeys (*Aotus* spp.) to the U.S., 4,168 or 97% of all red-bellied tamarins (*Saguinus labiatus*), and 7,949 or 64% of all squirrel monkeys (*Saimiri sciureus*) (Table 3). In 1980 alone, Bolivia supplied the U.S. with over 59% of all primates from the Neotropics (Table 1), including 16 different species (Table 3).

Colombia. Between 1964 and 1973, over 13,600 primates entered the U.S. from Colombia (Table 1). In 1971 and 1972, over 19 species were traded, including over 200 pygmy marmosets (*Cebuella pygmaea*), 6,600 tamarins (*Saguinus* spp.), 10,000 squirrel monkeys (*Saimiri sciureus*), 6,100 night monkeys (*Aotus* spp.), 100 titi monkeys (*Callicebus* spp.), 5,700 capuchins (*Cebus* spp.), 1,700 spider monkeys (*Ateles* spp.), and 600 woolly monkeys (*Lagothrix lagotricha*) (Table 3).

In 1974, Colombia banned the export of primates (Kavanagh and Bennett, this volume). Since then, however, many smuggled Colombian primates have entered the U.S. via Panama (Donadio, 1978; Hernandez Camacho, in litt., 1980; see also "Panama" below).

Guyana. Guyana has been a consistent supplier of primates to the U.S. since the early 1960's, exporting under 1,000 annually prior to 1973 (Table 1). In 1974, following the Peruvian and Colombian primate bans, just over 1,000 primates were imported from Guyana, and imports increased to almost 3,000 the following year. Since 1976, however, primate imports from Guyana returned to under 1,000 per year.

Squirrel monkeys accounted for 3,606 or 96% of all primates supplied by Guyana to the U.S. from 1976 to 1980 (Table 3); capuchins (*Cebus* spp.) accounted for almost all of the remainder.

Panama. Panama is another country that became involved in the primate trade following the export bans by Colombia and Peru. The U.S. imported no primates from Panama between 1964 and 1972, but imported over 3,000 from 1974 to 1978 (Table 1). Many of the declared species exported by Panama are not found in the country, including white-faced and common marmosets (*Callithrix geoffroyi* and *C. jacchus*), pygmy marmosets (*Cebuella pygmaea*), cotton-top tamarins (*Saguinus oedipus*), squirrel monkeys (*Saimiri sciureus*), white-fronted and black-tufted capuchins (*Cebus albifrons* and *C. apella*) and black spider monkeys (*Ateles paniscus*) (Table 3). In 1978, a report documented the smuggling of protected Colombian wildlife into Panama for transshipment (Donadio, 1978). Since 1979, no primates have been exported to the U.S. (Table 1), and, in January 1980, all primate species in Panama were placed on a schedule prohibiting hunting, capture, buying, selling, or export (Anon., 1982).

Paraguay. The U.S. began annual imports of primates from Paraguay in 1970 (Table 1). Imports increased from less than 1,000 per year prior to the bans by Peru and Colombia, to over 1,000 per year in 1974 and 1975. In November 1975, Paraguay banned the export of all native species of wildlife (Kavanagh & Bennett, this volume). Since 1976, however, primates have continued to be exported from Paraguay to the U.S. (Table 1); over 1,100 entered the U.S. in 1976 and a further 1,600 entered between 1977 and 1980. These included 764 common marmosets (*Callithrix jacchus*), a species found only in Brazil and protected there from trade since 1967, and 1,442 cotton-top tamarins (*Saguinus oedipus*), which are endemic to Colombia and protected in that country (Table 3).

In 1979, a major smuggling operation of cat furs and reptile skins transshipped through Paraguay was uncovered by the CITES Secretariat (Lamb, 1980). The Paraguayan government has since taken steps to counter the illegal wildlife trade. Since December, 1980, no primates have entered the U.S. from Paraguay (TRAFFIC-U.S.A., unpublished data). According to information received from a U.S. State Department telex (TRAFFIC-U.S.A. files) Paraguay suspended the issuance of CITES permits in November, 1981, pending the implementation of new regulations.

Peru. Over 360,000 primates were imported from Peru by the U.S. in the ten-year period 1964-1973 (Table 1). During that period, Peru accounted for 38% of all primate imports and 70% of all Neotropical imports into the United States. In 1971 and 1972 alone, over 2,000 tamarins (*Saguinus* spp.), 43,000 squirrel monkeys (*Saimiri sciureus*), 3,800 capuchins (*Cebus* spp.), 3,600 woolly monkeys (*Lagothrix lagotricha*), and 600 spider monkeys (*Ateles* spp.) were imported from Peru (Table 3).

In 1973, Peru banned the commercial export of primates (Kavanagh & Bennett, this volume). In 1976, the Pan American Health Organization (PAHO) was awarded a U.S. government contract from the National Institutes of Health to establish a primate breeding colony in Peru and to provide primates to the U.S. for scientific research (see Eudey & Mack, this volume). Since then, Peru has supplied the U.S. with 100 pygmy marmosets (*Cebuella pygmaea*), 1,575 moustached tamarins (*Saguinus mystax*), 720 saddle-back tamarins (*Saguinus fuscicollis*), 30 red-bellied tamarins (*Saguinus labiatus*), and 820 squirrel monkeys (*Saimiri sciureus*) (Table 3). Due to the problems relating to disease and breeding, only a very small proportion of the primates exported from Peru were captive-bred (R. Castro, pers. comm., 1982).

VII. Trade-Related Primate Mortality

The number of primates taken from the wild cannot be assessed solely from trade statistics. Primate mortality from capture to final destination at a researcher's facility also takes a significant toll. In the 1960's Latin American primate losses from capture to final recipient were estimated at between 25% and 80% (Warland, 1972). In holding compounds alone, one South American dealer gave the following primate losses: 15% for *Saimiri* and *Cebus*; 20% for *Aotus*; 27% for *Lagothrix*; and a range from 3% to 33% for the marmoset and tamarin species (Thorington, 1972). Other information on capture techniques and mortality of New World primates in the late 1960's can be found in Avila-Pires (1972), Soini (1972), and Tsalickis (1972).

Since the early 1970's, very little has been written about primate mortality. According to one U.S. importer, trade-related mortality is generally believed to be less than a decade ago (J. Porter, in litt., 1982), and the higher cost of primates today has caused dealers to take better care in capture and handling. However, one Indonesian exporter reported in 1979 that long-tailed macaques experienced a 68% mortality from capture to export (Darsono, 1979).

The information presented below provides, for the first time, a detailed account of the mortality sustained by primates during importation into the U.S., although it is restricted to the years 1978 and 1979.

According to information analyzed from Center for Disease Control Import forms, 5,206 or 18.2% of the 28,558 primates imported into the U.S. in 1978 were dead-on-arrival or died within 90 days of entering the country (Table 4), and in 1979, 3,818 or 17.1% of the 22,276 primates imported experienced comparable mortality. Mortality rates ranged from a low of 15.3% for all African species in 1978 to a high of 25.1% for Neotropical species during the same year.

Mortality rates are broken down by species and by country of export in Table 4. Mortality ranged from none, usually for species imported in small numbers such as *Ateles geoffroyi* or *Cercopithecus mona*, to 88.5% for *Presbytis cristata*, an Asian monkey that is particularly difficult to maintain in captivity. In both 1978 and 1979, the greatest number of deaths were recorded for the long-tailed macaque, *Macaca fascicularis*, which was also the most frequently imported species by the U.S. during the same period. For the two years combined, 4,787 or 16.9% of the total 28,415 long-tailed macaques were dead-on-arrival or died within 90 days following entry into the U.S. Mortality averaged 13.7% for imports from the Philippines, 17.7% for Indonesia, and 18.5% for Malaysia. In contrast, only 221 or 4.4% of the 4,979 rhesus monkeys, *Macaca mulatta*, imported from India in 1978 died (Table 4). The lower mortality experienced by rhesus monkeys appears to have been, in part, a consequence of controls implemented by the government of India over conditions of primate capture and transport (Muckenhirn, 1975).

Species suffering mortality greater than 18% in either 1978 or 1979 are listed below:

Species	Percentage of Shipment-related Deaths
(1978)	
Presbytis cristata	88.5
Tupaia glis	59.2
Aotus spp.	37.6
Callithrix jacchus	35.1
Saguinus mystax	34.7
Cebus capucinus	28.6
Galago senegalensis	23.9
Saimiri sciureus	23.1
Cercopithecus aethiops	21.1
Macaca fascicularis	18.6
(1979)	
Callithrix argentata	70.3
Callithrix penicillata	57.9
Tupaia glis	45.5
Callithrix jacchus	29.7
Ceropithecus aethiops	29.2
Galago spp.	22.9
Saimiri sciureus	21.6
Cebuella pygmaea	18.8

Although a high percentage of dead and dying primates in an individual shipment might be considered a violation of Section 42 of the Lacey Act (Title 18, United States Code), which makes it illegal for any person, including an importer, to knowingly cause or permit any wild animal to be imported under unhealthy conditions, no prosecutions have occurred. To date, Thailand is the only country that has taken legal action in response to excessive mortality of primates shipped to the U.S. In December, 1980, the Cabinet of Thailand added the tree shrew, *Tupaia glis*, to the list of protected wild animals and banned its export because of fatalities in excess of 40% on arrival to the U.S. (Anon, 1980b). Subsequently, the Wildlife Conservation and Protection Committee of Thailand issued a permit for the export of 100 tree shrews to a major U.S. primate importer for use in "scientific research" (Suvanakorn, in litt., 1981). In June, 1981, this shipment of 100 tree shrews arrived in the United States; 44 were dead-on-arrival (S. McGreal, in litt., 1981). None has been imported from Thailand since (TRAFFIC-U.S.A., unpublished data).

The green monkey or vervet, *Cercopithecus aethiops*, appears to be a species that is stressed during capture and transport. For the combined years 1978 and 1979, the U.S. imported 4,677 green monkeys, of which 1,196 or 25.6% were dead-on-arrival or within 90 days of entering the U.S. (Table 4). The U.S. National Heart, Lung, and Blood Institute is developing programs to study the green monkey as a model for the study of hypertension (Interagency Primate Steering Committee, 1978), which suggests that biomedical researchers already may have recognized the effects of stress on this species.

The U.S. imports green monkeys from Ethiopia, Kenya, and Somalia; small numbers are also obtained from several West Indies countries. In 1978 and 1979, 47% of the green monkeys imported from Ethiopia died (Table 4). In contrast, only 23.3% of the green monkeys imported from Kenya and 17.9% from Somalia died. Similarly, 11.6% of the baboons (*Papio* spp.) imported from Ethiopia died either upon or after entry to the U.S. as compared to only 4.5% of the baboons imported from Kenya and 2.0% from Senegal (Table 4). These data strongly suggest that countries have different standards for the capture, care and conditioning of primates, resulting in greater or lesser exposure to stress.

VIII. Primate Exports from the United States

From 1978 to 1980, the U.S. annually exported more than 4,000 primates to 20 countries in Europe, Asia, and elsewhere in the Americas (Table 5). Almost all these primates were re-exports, as they had been imported to the U.S. during the same or previous year. Canada and France received over 2,000 primates per year from the U.S.; West Germany, Italy, and Japan imported several hundred per year. Annual re-exports of long-tailed macaques accounted for between 2,000 and 3,000 of all animals and green monkeys totaled about 1,000 re-exports annually. In 1979 and 1980, one commercial primate dealer exported 166 captive-bred rhesus monkeys to Canada, France, and West Germany. Exports of many endangered primates (e.g., orang-utan, *Pongo pygmaeus*; golden lion tamarin, *Leontopithecus rosalia*) were made to zoological gardens for breeding purposes; many of these were captive-bred animals.

During 1979 and 1980, the U.S. re-exported, through the

State Department, pygmy marmosets (*Cebuella pygmaea*), moustached tamarins (*Saguinus mystax*) and squirrel monkeys (*Saimiri sciureus*) to Japan, West Germany, and the Soviet Union (Table 5). These animals originally were obtained from Peru through the Pan American Health Organization (see "Regional Synopsis - Peru").

IX. Availability of Primates in the U.S.

U.S. import statistics do not accurately indicate the number of primates available for use in biomedical activities because they do not include the number of primates re-exported to other countries (Table 5), the losses of primates upon arrival in the U.S. (Table 4), and deaths prior to arrival at user facilities (Table 4). For the years 1978 and 1979, data recorded on Center for Disease Control Primate Import documents make it possible to adjust import figures to obtain a more realistic assessment of the numbers of primates actually available for use in the U.S. (Table 6). Importations made directly by U.S. government agencies are not included since these agencies are exempt from filing with the Center for Disease Control. Government agencies, however, account for probably less than 5% of direct primate imports.

Of the 28,558 primates imported by the U.S. in 1978, 17,480 or 61.2% were available for use; and of the 22,276 imported in 1979, 13,970 or 62.7% were available (Table 6). In addition, a further 858 (418 in 1978 and 440 in 1979), or 1.7% of all U.S. primates imported over the two-year period, were sacrificed for scientific use (e.g., tissue samples) on the premises of the importer (Table 6).

X. Primate Trophy Imports

In 1980, 92 primate trophies were imported by the United States (Table 7). All came from African countries, with 26 or 28.3% from South Africa and 25 or 27.2% from Zimbabwe. Of the 92 specimens, 74 or 80.4% were baboons (*Papio* spp.). Three galagos (*Galago* spp.) were also included among the trophies.

XI. Summary

From 1964 to 1980, U.S. primate imports totaled 1,178,337 (Table 1). Peru, India, and Colombia were the principal suppliers, accounting for 70.9% of all imports during this period, although all three countries banned primate export during the 1970's (see Kavanagh & Bennett, this volume). From a high of 126,857 in 1968, annual primate imports steadily declined to a low of 22,371 in 1980. The number of primate species imported similarly declined from 107 during 1968-1972 to 79 during 1976-1980 (Table 2). During the former period, squirrel monkeys (*Saimiri sciureus*) and rhesus monkeys (*Macaca mulatta*) were the most numerous imports, together accounting for 65.1% of total imports. During the period 1976-1980, the long-tailed macaque (*Macaca fascicularis*) was the principal import, accounting for 37.8% of all primate imports. Several factors contributed to the decline in both numbers and kinds of primates imported into the U.S.:

1. The single most important factor contributing to the reduction of primate imports into the U.S. has been the imposition of quotas or bans on primate exports by source countries. The bans imposed by Colombia and Peru in 1973 and by India in 1978 reduced worldwide primate exports considerably (see Kavanagh, this volume).
2. In 1975, the U.S. Public Health Service established a regulation prohibiting the importation of primates into the U.S. as pets. Most of the Neotropical primates imported in the 1960's and early 1970's went into the pet trade (J. Porter, in litt., 1982).
3. The U.S. enacted the Endangered Species Conservation Act of 1969, which later became the Endangered Species Act of 1973, by which it became unlawful to import (or export) any endangered wildlife, except for scientific research or for enhancing the breeding or survival of the species.
4. The U.S. became a party to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) in 1975. The permit system required by CITES contributed to the elimination of imports of many primates that had been illegally exported from their country of origin.
5. Fewer primates are now being used in the U.S. for biomedical and behavioral research and for industrial production and testing. The following factors have all contributed to this reduction: increased purchase and maintenance costs, multiple use of primates, extended maintenance of research subjects, reduction of sample sizes for both experimentation and testing, the development of alternative models, and, of course, the difficulties of obtaining wild caught primates. These factors, as well as the development of captive breeding and exchange programs in the U.S. (see Eudey & Mack, this volume), have reduced significantly the U.S. share of total numbers of primates taken from the wild.

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TABLE 1

TOTAL NUMBER OF PRIMATES IMPORTED INTO THE UNITED STATES DURING THE PERIOD 1964-1980, BY COUNTRY OF ORIGIN.

COUNTRY OF ORIGIN	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	TOTAL IMPORTS 1964-1980 (Percent of total imports)	
ASIA AND PACIFIC																			
Bangladesh	-	-	-	-	-	-	-	-	50	515	340	53	1,070	11	386	348	-	2,773	(0.24%)
Kampuchea	941	2,719	3,969	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7,629	(0.65%)
P.R. China	-	-	-	-	-	-	-	-	-	-	-	20	45	-	-	-	-	65	(0.006%)
Hong Kong	49	-	-	-	-	-	-	-	3	15	-	-	9	-	-	-	-	76	(0.006%)
India	31,640	27,121	26,268	30,849	30,315	29,734	26,056	21,152	21,330	25,413	20,774	15,339	11,185	10,139	4,882	-	-	332,197	(28.19%)
Indonesia	26	-	-	-	-	150	110	255	240	280	1,383	965	1,400	1,682	5,544	6,185	5,664	23,884	(2.03%)
Japan	113	58	165	115	283	-	-	-	-	-	-	5	5	-	3	3	-	750	(0.06%)
Laos	112	-	-	-	66	33	167	67	52	160	10	76	-	-	-	-	-	743	(0.06%)
Macau	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20	-	-	20	(0.002%)
Malaysia	965	3,009	2,223	1,490	1,889	1,440	1,906	1,178	657	2,301	2,534	3,012	3,405	3,547	5,888	4,049	1,040	40,533	(3.44%)
New Zealand	-	-	-	-	-	-	-	-	5	12	-	-	-	-	29	-	-	41	(0.003%)
Pakistan	2,974	2,364	2,455	1,298	1,270	566	707	195	-	-	33	-	-	-	-	-	-	11,862	(1.01%)
Philippines	1,874	3,769	5,095	2,478	705	-	130	480	300	925	1,478	1,950	1,700	3,600	3,200	4,745	7,266	39,695	(3.37%)
Singapore	-	-	-	-	75	41	55	20	80	145	63	10	-	-	63	-	30	582	(0.05%)
Taiwan	-	-	-	94	-	-	-	-	15	-	-	33	-	10	-	-	-	152	(0.01%)
Thailand	3,785	2,439	2,026	2,057	2,855	1,876	1,738	2,101	2,425	2,201	2,106	2,402	1,791	685	1,390	400	428	32,705	(2.78%)
Other	257	-	-	-	-	-	-	-	-	-	40	150	-	-	-	-	-	447	(0.04%)
REGIONAL SUBTOTAL (Percent of total annual imports)	42,736 41.9%	41,479 43.2%	42,201 40.6%	38,381 36.8%	37,458 29.5%	33,840 32.0%	30,869 34.0%	25,448 31.9%	25,152 33.2%	31,967 46.0%	28,761 61.7%	24,015 58.8%	20,610 61.5%	19,674 68.9%	21,405 74.4%	15,730 69.0%	14,428 64.5%	494,154	(41.94%)

TABLE I (cont.)

COUNTRY OF ORIGIN	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	TOTAL IMPORTS 1964-1980 (Percent of total imports)
AFRICA																		
Botswana	-	-	-	-	-	-	-	-	60	-	-	-	-	20	-	-	-	80 (0.007%)
Cameroon	-	2	14	15	12	13	188	-	-	6	-	-	-	-	-	-	-	250 (0.02%)
Chad	-	-	-	-	-	-	-	-	6	100	-	10	-	-	-	-	-	116 (0.01%)
Djibouti	-	-	-	-	-	-	-	-	-	-	-	-	60	-	-	-	72	132 (0.01%)
Ethiopia	3,440	3,633	4,481	3,640	5,628	3,493	2,556	1,161	929	1,972	1,957	928	459	586	703	757	200	36,523 (3.10%)
Ghana	20	-	-	-	-	7	-	-	-	23	9	33	-	-	-	-	-	92 (0.008%)
Kenya	5,199	2,589	4,015	3,228	1,398	1,622	1,324	1,024	754	1,200	1,583	1,825	3,607	2,635	1,824	1,795	1,550	37,172 (3.15%)
Liberia	26	21	42	44	29	84	64	68	64	98	83	54	-	-	-	-	-	677 (0.06%)
Madagascar	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	2 (0.0%)
Nigeria	396	195	6	150	78	106	150	90	173	320	200	171	209	110	89	20	56	2,519 (0.21%)
Senegal	3	-	100	-	35	97	21	56	212	100	140	161	-	-	-	-	-	925 (0.08%)
Sierra Leone	581	482	334	280	259	135	113	92	81	115	271	330	166	-	-	-	-	3,239 (0.27%)
Somalia	2,536	2,218	3,198	2,252	489	-	660	1,080	1,316	1,594	2,555	1,842	204	438	1,032	1,216	1,404	24,034 (2.04%)
South Africa	220	-	-	-	-	47	42	-	8	17	-	15	7	3	16	72	59	506 (0.04%)
Tanzania	595	1,283	1,568	652	634	870	954	577	1,157	697	-	-	-	-	-	-	-	8,987 (0.76%)
Uganda	61	23	9	130	-	-	-	-	-	25	39	10	-	-	-	-	-	297 (0.02%)
Other	237	13	102	72	38	-	5	11	-	30	-	-	-	-	-	-	-	508 (0.04%)
REGIONAL SUBTOTAL Percent of total annual imports)	13,314 13.0%	10,459 10.9%	13,869 13.4%	10,463 10.0%	8,600 6.8%	6,474 6.1%	6,077 6.7%	4,159 5.2%	4,760 6.3%	6,297 9.1%	6,837 14.9%	5,379 13.2%	4,712 14.1%	3,792 13.3%	3,664 12.7%	3,862 16.9%	3,341 14.9%	116,059 (9.85%)

TABLE 1 (cont.)

COUNTRY OF ORIGIN	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	TOTAL IMPORTS 1964-1980 (Percent of total imports)
SOUTH AND CENTRAL AMERICA AND THE CARIBBEAN																		
Argentina	-	-	-	-	-	-	-	-	-	-	-	-	1,090	-	-	-	-	1,090 (0.09%)
Bolivia	-	-	-	267	-	-	-	-	100	333	3,760	4,135	3,787	3,095	2,258	2,063	2,563	22,361 (1.90%)
Brazil	778	550	154	42	370	266	2,102	477	100	-	81	-	-	-	10	-	-	4,930 (0.42%)
Colombia	6,841	9,123	9,491	13,879	24,105	17,563	16,826	15,910	16,124	6,444	2,313	21	-	-	-	-	-	138,640 (11.77%)
Costa Rica	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	4 (0.0%)
Ecuador	317	-	-	199	147	221	-	-	-	97	-	99	-	-	-	-	-	1,080 (0.09%)
Guatemala	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	93	93 (0.008%)
Guyana	660	261	237	955	916	260	-	481	336	708	1,066	2,940	895	-	433	368	838	11,354 (0.96%)
Honduras	-	-	-	-	-	-	-	-	-	-	-	98	9	-	-	-	-	107 (0.009%)
Leeward and Windward Islands*	-	-	-	-	-	-	-	-	-	-	-	33	33	183	171	130	204	754 (0.06%)
Montserrat	-	-	-	-	-	-	-	-	-	-	-	-	-	100	-	-	-	100 (0.008%)
Nicaragua	63	-	-	-	569	513	689	671	525	-	24	308	153	20	-	-	-	3,535 (0.30%)
Panama	-	-	-	-	-	-	-	-	-	12	247	929	526	709	624	-	-	3,047 (0.26%)
Paraguay	122	-	-	-	169	-	477	557	941	608	1,127	1,881	1,152	491	150	461	539	8,675 (0.74%)
Peru	36,847	33,634	37,384	39,600	53,773	45,980	32,729	31,550	27,288	22,669	2,251	640	-	-	-	-	100	364,445 (30.93%)
Trinidad	2	-	-	-	-	-	-	-	-	-	-	-	8	-	-	-	-	10 (0.001%)
Uruguay	-	-	-	-	40	-	-	-	-	-	-	-	100	395	-	-	-	535 (0.05%)
Other	-	-	-	-	-	-	-	180	-	-	-	89	-	-	-	-	-	269 (0.02%)
REGIONAL SUBTOTAL (Percent of total annual imports)	45,630 44.7%	43,568 45.3%	47,266 45.5%	54,942 52.7%	80,089 63.1%	64,803 61.3%	52,823 58.2%	49,826 62.4%	45,414 59.9%	30,871 44.4%	10,869 23.3%	11,173 27.4%	7,753 23.1%	4,993 17.5%	3,650 12.7%	3,022 13.3%	4,337 19.4%	561,029 (47.61%)

*Includes St. Kitts, Nevis, and Barbados

TABLE 1 (cont.)

COUNTRY OF ORIGIN	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	TOTAL IMPORTS 1964-1980 (Percent of total imports)
EUROPE AND CANADA																		
Austria	100	-	-	-	192	-	-	100	-	200	-	-	-	-	-	-	-	592 (0.05%)
Belgium	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	158	-	159 (0.01%)
Canada	-	4	275	-	-	-	-	7	1	6	24	57	115	8	11	13	126	647 (0.05%)
France	3	-	25	-	-	-	11	9	-	30	-	-	-	-	-	2	45	125 (0.01%)
Italy	-	-	-	-	-	-	-	-	-	-	-	60	-	1	-	-	-	61 (0.005%)
Netherlands	280	318	8	6	31	11	206	10		-	-	67	253	-	46	12	74	1,322 (0.11%)
St. Helena	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20	20 (0.002%)
United Kingdom	-	41	108	53	175	-	199	83	457	177	70	63	96	91	-	-	-	1,613 (0.14%)
West Germany	5	-	-	-	-	259	-	1	-	-	-	-	-	-	2	2	-	269 (0.02%)
Other	11	-	47	-	160	-	-	-	-	-	-	-	-	-	-	-	-	218 (0.02%)
REGIONAL SUBTOTAL Percent of total annual imports)	400 0.4%	363 0.4%	463 0.5%	59 0.1%	558 0.4%	270 0.3%	416 0.5%	210 0.3%	458 0.6%	413 0.6%	94 0.2%	247 0.6%	464 1.4%	100 0.4%	59 0.2%	187 0.8%	265 1.2%	5,026 (0.43%)
UNKNOWN (Percent of total annual imports)	- 0	243 0.3%	60 0.1%	501 0.5%	152 0.1%	332 0.3%	558 0.6%	203 0.3%	- 0	- 0	20 0.04%	- 0	- 0	- 0	- 0	- 0	- 0	2,069 (0.18%)
TOTAL 1964-1980	102,080	96,112	103,859	104,346	126,857	105,719	90,743	79,846	75,784	69,548	46,581	40,814	33,539	28,559	28,778	22,801	22,371	1,178,337 (100%)

Source: *US Imports* (IM-146), U.S. Customs Service statistics, compiled by Bureau of Census, U.S. Department of Commerce. Numbers of primates in shipments valued at less than $250 are not included.

TABLE 2

TOTAL NUMBER OF PRIMATES, IDENTIFIED BY FAMILY AND SPECIES, IMPORTED INTO THE UNITED STATES DURING THE PERIODS 1968-1972 AND 1976-1980.

SPECIES BY FAMILY[1]	1968-1972 IMPORTATIONS	PERCENT OF TOTAL	1976-1980 IMPORTATIONS	PERCENT OF TOTAL
TUPAIIDAE[2]				
Tupaia glis (tree shrew)	2,660	0.58	4,389	3.14
Tupaia tana (common greater tupaia)	30	0.007	—	—
INDRIIDAE				
Propithecus verreauxi (sifaka)	11	0.002	—	—
LEMURIDAE				
Hapalemur griseus (grey gentle lemur)	3	0.001	1	0.001
Lemur catta (ring-tailed lemur)	74	0.02	1	0.001
Lemur macaco (black lemur)	5	0.001	9	0.01
Lemur mongoz [including *L. coronatus*] (mongoose lemur)	25	0.01	2	0.001
Varecia variegata (ruffed lemur)	8	0.002	4	0.003
Lemur spp. (lemur)	2	0	—	—
Lepilemur mustelinus (weasel lemur)	1	0	—	—
Cheirogaleus major (greater dwarf lemur)	—	—	2	0.001
Cheirogaleus medius (dwarf lemur)	3	0.001	—	—
Microcebus murinus (lesser mouse lemur)	15	0.003	—	—
Microcebus spp. (mouse lemur)	2	0	—	—
LORISIDAE — ASIAN SPECIES				
Loris tardigradus (slender loris)	24	0.01	—	—
Nycticebus coucang (slow loris)	337	0.07	21	0.02
LORISIDAE — AFRICAN SPECIES				
Arctocebus calabarensis (angwantibo)	1	0	—	—
Galago alleni (Allen's galago)	1	0	—	—
Galago (= Otolemur) crassicaudatus (thick-tailed galago)	59	0.01	—	—
Galago demidovii (Demidoff's galago)	215	0.05	30	0.02
Galago senegalensis (bushbaby)	581	0.13	862	0.62
Galago spp. (galago)	197	0.04	—	—
Perodicticus potto (potto)	73	0.02	—	—

TABLE 2 (cont.)

SPECIES BY FAMILY[1]	1968-1972 IMPORTATIONS	PERCENT OF TOTAL	1976-1980 IMPORTATIONS	PERCENT OF TOTAL
TARSIIDAE				
Tarsius spp. (tarsier)	1	0	—	—
CALLITRICHIDAE				
Callimico goeldii (Goeldi's monkey)	179	0.04	—	—
Callithrix argentata (black-tailed marmoset)	119	0.03	171[2]	0.12
Callithrix aurita (buffy-tufted-ear marmoset)	251	0.05	—	—
Callithrix humeralifer [*C. chrysoleuca*][3] (golden or silky marmoset)	22	0.005	—	—
Callithrix geoffroyi (white-faced marmoset)	94	0.02	1	0.001
Callithrix jacchus (white-tufted ear or common marmoset)	190	0.04	1,005	0.72
Callithrix penicillata (black-tufted-ear marmoset)	62	0.01	19	0.01
Callithrix spp. (marmoset)	77	0.02	780	0.56
Cebuella pygmaea (pygmy marmoset)	1,305	0.28	102	0.07
Cebuella sp. (pygmy marmoset)	—	—	4	0.003
Leontopithecus rosalia (golden lion tamarin)	349	0.08	5	0.004
Saguinus fuscicollis [including *S. f. illigeri*] (saddle-back tamarin)	829	0.18	723	0.52
Saguinus nigricollis [including *S. n. graellsi*] (black-mantled tamarin)	9,144	1.98	62	0.04
Saguinus imperator (emperor tamarin)	—	—	31	0.02
Saguinus leucopus (silvery-brown bare-face tamarin)	33	0.01	2	0.001
Saguinus labiatus [= *rufiventer*] (red-bellied tamarin)	101	0.02	4,296	3.08
Saguinus midas [= *tamarin*] (golden- or black-handed tamarin)	34	0.01	14	0.01
Saguinus mystax (moustached tamarin)	3,706	0.80	1,683	1.20
Saguinus oedipus (cotton-top or white-plumed bare-face tamarin)	13,711	2.97	1,669	1.19
Saguinus geoffroyi (rufous-naped or red-crested bare-face tamarin)	38	0.01	26	0.02
Saguinus spp. (tamarin)	95	0.02	1,262	0.90
Callitrichidae spp. (marmosets and tamarins)	66	0.01	—	—

TABLE 2 (cont.)

SPECIES BY FAMILY[1]	1968-1972 IMPORTATIONS	PERCENT OF TOTAL	1976-1980 IMPORTATIONS	PERCENT OF TOTAL
CEBIDAE				
Aotus trivirgatus (night or owl monkey, douroucouli)[4]	20,869	4.52	3,300	2.36
Callicebus moloch [*C. cupreus, C. brunneus*] (titi monkey)	752	0.16	61	0.04
Callicebus torquatus (widow or titi monkey)	—	—	30	0.02
Cacajao melanocephalus (black uakari)	4	0	—	—
Cacajao calvus rubicundus (red uakari)	210	0.05	1	0.001
Pithecia monachus (monk saki)	365	0.08	—	—
Pithecia pithecia (white-faced saki)	15	0.003	18	0.01
Chiropotes albinasus (white-nosed saki)	—	—	2	0.001
Chiropotes satanas (bearded saki)	28	0.01	—	—
Alouatta caraya (black howler)	22	0.005	9	0.01
Alouatta seniculus (red howler)	58	0.01	—	—
Alouatta villosa[5] (mantled howler)	362	0.08	1	0.001
Alouatta spp. (howler)	50	0.01	—	—
Cebus albifrons (white-fronted capuchin)	17,823	3.86	63	0.05
Cebus apella (black-tufted capuchin)	6,666	1.45	1,104	0.79
Cebus capucinus (white-faced capuchin)	7,448	1.61	91	0.07
Cebus nigrivittatus (weeper capuchin)	253	0.05	22	0.02
Cebus spp. (capuchin)	622	0.13	14	0.01
Saimiri sciureus [including *S.s. oerstedii*] (squirrel monkey)	173,055	37.52	12,512	8.96
Saimiri spp. (squirrel monkey)	355	0.08	—	—
Ateles belzebuth (long-haired spider monkey)	335	0.07	—	—
Ateles fusciceps (brown-headed spider monkey)	252	0.05	15	0.01
Ateles geoffroyi (black-handed spider monkey)	7,981	1.73	133	0.10
Ateles paniscus (black spider monkey)	2,487	0.54	67	0.05
Ateles spp. (spider monkey)	512	0.11	38	0.03
Brachyteles arachnoides (muriqui or woolly spider monkey)	39	0.01	—	—
Lagothrix lagotricha (woolly monkey)	12,808	2.78	—	—

TABLE 2 (cont.)

SPECIES BY FAMILY[1]	1968-1972 IMPORTATIONS	PERCENT OF TOTAL	1976-1980 IMPORTATIONS	PERCENT OF TOTAL
CERCOPITHECIDAE — ASIAN SPECIES				
SUBFAMILY CERCOPITHECINAE				
Macaca arctoides [= *speciosa*] (stumptail macaque)	6,717	1.46	456	0.33
Macaca assamensis (Assamese macaque)	—	—	905	0.65
Macaca cyclopis (Taiwan, Formosan or rock macaque)	70	0.02	—	—
Macaca fascicularis [= *irus*] (long-tailed or crab-eating macaque, cynomolgus)	8,058	1.75	54,168	38.78
Macaca fuscata (Japanese macaque)	23	0.005	15	0.01
Macaca maura (Moor macaque)	18	0.004	—	—
Macaca mulatta (rhesus macaque or rhesus monkey)	127,004	27.53	27,340	19.57
Macaca nemestrina (pig-tailed macaque)	2,730	0.59	1,540	1.10
Macaca nigra (Celebes black "ape")	168	0.04	8	0.01
Macaca radiata (bonnet macaque)	93	0.02	14	0.01
Macaca silenus (lion-tailed macaque)	20	0.004	—	—
Macaca spp. (macaque)	216	0.05	—	—
SUBFAMILY COLOBINAE				
Presbytis cristata (silvered leaf monkey or silvered langur)	71	0.02	26	0.02
Presbytis entellus (Hanuman, common, or grey langur)	41	0.01	4	0.003
Presbytis francoisi (Francois' leaf monkey)	—	—	4	0.003
Presbytis melalophos (banded leaf monkey or banded langur)	3	0	—	—
Presbytis obscura (dusky or spectacled leaf monkey)	49	0.01	1	0.001
Presbytis phayrei (Phayre's leaf monkey)	5	0.001	—	—
Presbytis pileatus (capped langur)	2	0	—	—
Presbytis senex (purple-faced langur)	2	0	9	0.01
Presbytis spp. (leaf monkey or langur)	12	0.003	—	—
Pygathrix nemaeus (douc langur)	35	0.01	—	—
Nasalis larvatus (proboscis or long-nosed monkey)	20	0.004	—	—

TABLE 2 (cont.)

SPECIES BY FAMILY[1]	1968-1972 IMPORTATIONS	PERCENT OF TOTAL	1976-1980 IMPORTATIONS	PERCENT OF TOTAL
CERCOPITHECIDAE — AFRICAN SPECIES				
SUBFAMILY CERCOPITHECINAE				
Cercocebus torquatus [= *atys*] (white collared or sooty mangabey)	35	0.01	—	—
Cercocebus spp. (mangabey)	—	—	4	0.003
Macaca sylvanus (Barbary macaque or Barbary "ape")	23	0.005	—	—
Papio anubis (olive baboon)	3,039	0.66	4,468	3.20
Papio cynocephalus (yellow baboon)	336	0.07	705	0.50
Papio hamadryas (hamadryas baboon)	355	0.08	98	0.07
Papio [= *Mandrillus*] *leucophaeus* (drill)	9	0.002	1	0.001
Papio papio (Guinea baboon)	328	0.07	156	0.11
Papio [= *Mandrillus*] *sphinx* (mandrill)	61	0.01	—	—
Papio ursinus (chacma baboon)	—	—	342	0.24
Papio spp. (baboon)	255	0.06	259	0.19
Theropithecus gelada (gelada baboon)	1,231	0.27	10	0.01
Cercopithecus aethiops, [including *C.a. sabaeus*, *C.a. pygerythrus*] (green, vervet, or grivet monkey)	18,536	4.02	13,238	9.48
Cercopithecus ascanius (redtail or black-cheeked white-nosed monkey)	10	0.002	24	0.02
Cercopithecus cephus (moustached monkey)	15	0.003	—	—
Cercopithecus diana (diana monkey)	99	0.02	—	—
Cercopithecus hamlyni (Hamlyn's or owl-faced monkey)	—	—	6	0.004
Cercopithecus mitis (Syke's or blue monkey)	21	0.005	—	—
Cercopithecus mona (mona monkey)	77	0.02	4	0.003
Cercopithecus erythrotis (red-eared monkey)	3	0.001	—	—
Cercopithecus neglectus (De Brazza's monkey)	87	0.02	8	0.01
Cercopithecus nictitans (greater white-nosed or putty-nosed monkey)	68	0.01	13	0.01
Cercopithecus petaurista (lesser white-nosed or spot-nosed monkey)	2	0	11	0.01

TABLE 2 (cont.)

SPECIES BY FAMILY[1]	1968-1972 IMPORTATIONS	PERCENT OF TOTAL	1976-1980 IMPORTATIONS	PERCENT OF TOTAL
Cercopithecus spp.	311	0.07	—	—
Allenopithecus [= *Ceropithecus*] *nigiriviridis* (Allen's swamp monkey)	4	0	—	—
Miopithecus [= *Cercopithecus*] *talapoin* (talapoin monkey)	113	0.02	—	—
Erythrocebus patas (patas monkey)	701	0.15	646	0.46
SUBFAMILY COLOBINAE				
Colobus badius (red colobus)	—	—	105	0.08
Colobus guereza [= *abyssinicus*] (Eastern black-and-white or Abyssinian colobus)	52	0.01	29	0.02
Colobus polykomos (western black-and-white or king colobus)	15	0.003	8	0.01
Colobus spp. (colobus monkey)	6	0.001	12	0.01
HYLOBATIDAE				
Hylobates concolor (white-cheeked, crested, black or Indochinese gibbon)	115	0.02	—	—
Hylobates hoolock (hoolock gibbon)	—	—	1	0.001
Hylobates lar [may include other *Hylobates* species] (white-handed, lar, or common gibbon)	394	0.09	3	0.002
Hylobates [=*Symphalangus*] *syndactylus* (siamang)	206	0.04	3	0.002
Hylobates spp. (gibbon)	38	0.01	—	—
PONGIDAE — ASIAN SPECIES				
Pongo pygmaeus (orang-utan)	4	0	1	0.001
PONGIDAE — AFRICAN SPECIES				
Pan troglodytes [including *Pan paniscus*] (chimpanzee)[6]	1,171	0.25	194	0.14
Gorilla gorilla (gorilla)	26	0.01	3	0.002
UNIDENTIFIED PRIMATES	47	0.01	186	0.13

FAMILIES	NUMBER OF SPECIES IN TRADE	1968-1972 IMPORTATIONS	PERCENT OF TOTAL	NUMBER OF SPECIES IN TRADE	1976-1980 IMPORTATIONS	PERCENT OF TOTAL
TUPAIIDAE	2	2,690	0.58	1	4,389	3.14
INDRIIDAE	1	11	0.002	—	—	—
LEMURIDAE	8	138	0.03	6	19	0.01

TABLE 2 (cont.)

FAMILIES	NUMBER OF SPECIES IN TRADE	1968-1972 IMPORTATIONS	PERCENT OF TOTAL	NUMBER OF SPECIES IN TRADE	1976-1980 IMPORTATIONS	PERCENT OF TOTAL
LORISIDAE — ASIAN SPECIES	2	361	0.08	1	21	0.02
LORISIDAE — AFRICAN SPECIES	6	1,127	0.24	2	892	0.64
TARSIIDAE	1	1	0	—	—	—
CALLITRICHIDAE	17	30,405	6.59	15	11,855	8.49
CEBIDAE	21	253,371	54.93	16	17,481	12.51
CERCOPITHECIDAE — ASIAN SPECIES						
SUBFAMILY CERCOPITHECINAE	10	145,117	31.46	8	84,446	60.45
SUBFAMILY COLOBINAE	9	240	0.05	5	44	0.03
CERCOPITHECIDAE — AFRICAN SPECIES						
SUBFAMILY CERCOPITHECINAE	22	25,719	5.58	16	19,993	14.31
SUBFAMILY COLOBINAE	2	73	0.02	3	154	0.11
HYLOBATIDAE	3	753	0.16	3	7	0.005
PONGIDAE — ASIAN SPECIES	1	4	0	1	1	0.001
PONGIDAE — AFRICAN SPECIES	2	1,197	0.26	2	197	0.14
UNIDENTIFIED PRIMATES	—	47	0.01	—	186	0.13
TOTAL	107	461,254	100	79	139,685	100

[1] Taxonomic terms that are synonyms used by importers to identify species are included in brackets.

[2] The family Tupaiidae is classified within the order Primates throughout this paper to agree with the procedure used by agencies of the U.S. government.

[3] 20 primates identified as *Saguinus argentata* are included in this figure.

[4] The genus *Aotus* recently has been divided into 8 species. Import documents listed only *A. trivirgatus*.

[5] May also include some *Alouatta palliata*.

[6] Very few *Pan paniscus* in trade relative to *Pan troglodytes*.

Source: Derived from data recorded on U.S. Fish and Wildlife Service Declaration for Importation of Wildlife Form 3-177 and supplementary data on Center for Disease Control Form 4.4878 8-75 for Fiscal Year 1976 (October, 1975 - September, 1976) and Calendar Years 1978 and 1979.

TABLE 3
U.S. PRIMATE IMPORTS
U.S. IMPORTS OF ASIAN PRIMATES

EXPORTING COUNTRY	SPECIES	1971	1972	1976	1977	1978	1979	1980
Bangladesh	*Macaca mulatta*[1]		130	1,043		314	226	
P. R. China	*Presbytis francoisi*							4
Hong Kong	**Hylobates concolor*		3					
	**Macaca mulatta*		48					
India	*Macaca arctoides*		10					
	Macaca assamensis			905				
	Macaca mulatta	21,376	22,595	12,385	7,827	5,125		
	Macaca radiata	28		14				
	Macaca silenus	2	1					
Indonesia	**Macaca arctoides*		20					
	Macaca fascicularis	50	80	1,110	1,252	5,281	6,041	5,296
	Macaca nemestrina	30	135	120	4	232	90	130
	Nasalis larvatus	2						
	Presbytis cristata					26		
	**Presbytis entellus*	1						
Japan	*Macaca fuscata*			3				
Laos	**Hylobates agilis*	29						
	Hylobates concolor	32	6					
	Hylobates lar[2]	14	18					
	Hylobates spp.	6						
	Macaca arctoides	6						
	Macaca fascicularis	1						
	Macaca mulatta	6						
	Macaca nemestrina	6						
	Unknown	1						
Malaysia	**Macaca arctoides*[3]	127	89	29		14		
	Macaca fascicularis	984	689	3,506	2,185	5,198	3,934	810
	Macaca nemestrina	147	204	106	148	497	194	
	Presbytis melalophos	2						
	Presbytis obscura	1						
	Tupaia glis		20					
	Tupaia tana		30					
Morocco	*Macaca sylvanus*	5						1
Pakistan	*Macaca mulatta*	190						
Philippines	*Macaca fascicularis*	430	300	1,950	2,400	3,333	4,628	7,068
	Macaca mulatta							96
Singapore	**Hylobates concolor*	2	1					
	**Hylobates lar*	13	37					
	**Hylobates (= Symphalangus) syndactylus*	42	83	3				
	**Hylobates* spp.		29					
	**Macaca arctoides*	5	11					
	Macaca fascicularis	7	11					
	**Macaca maura*	6						
	**Macaca nemestrina*	2	20					
	**Macaca nigra*	5	9					
	**Nycticebus coucang*	13						
	**Presbytis cristata*	1	3					
	**Presbytis obscura*		3					
	**Presbytis* spp.		1					

TABLE 3 (continued)

EXPORTING COUNTRY	SPECIES	1971	1972	1976	1977	1978	1979	1980
Sri Lanka	*Presbytis entellus*							4
	Presbytis senex		1	2				7
Taiwan	*Macaca cyclopis*	20	15					
	**Macaca maura*		1					
Thailand	*Hylobates concolor*		1					
	Hylobates lar		1					
	**Hylobates (= Symphalangus syndactylus*[4]	1						
	Hylobates spp.		3					
	Macaca arctoides	1,069	1,546	400				
	Macaca fascicularis	255	237	156				
	Macaca mulatta[5]	518	453	14				24
	Macaca nemestrina	251	222	17				
	Macaca spp.	34	39					
	Nycticebus coucang	59	58	4			10	7
	Presbytis cristata	34	31					
	**Presbytis entellus*	19	12					
	Presbytis obscura	9	21					
	Presbytis spp.		2					
	Tupaia glis	627	530	1,318	866	1,320	505	380
	Tupaia spp.	81						
Unknown	*Macaca silenus*		2					
COUNTRY OF RE-EXPORT								
Belgium	*Macaca mulatta*					146		
Bermuda	*Hylobates lar*			3				
Canada	*Hylobates hoolock*							1
	Macaca arctoides			1				
	Macaca fascicularis		80	20				
	Macaca fuscata			6				6
	Macaca mulatta		2	57		18		
	Macaca nemestrina			2				
	Macaca nigra		2				1	7
	Pongo pygmaeus			1				1
Denmark	*Hylobates lar*		30					
	Hylobates (= Symphalangus) syndactylus		2					
Netherlands	*Macaca arctoides*						12	
	Macaca mulatta					12		
	Pongo pygmaeus		1					
	Presbytis obscura						1	
Panama	*Macaca mulatta*			5				
United Kingdom	*Macaca mulatta*	6						
West Germany	*Pongo pygmaeus*		1					

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[1] The U.S. Interagency Primate Steering Committee reports that the National Institutes of Health received 862 rhesus monkeys in 1978 and 240 in 1979 from Bangladesh.

[2] The species may occur in a very restricted area west of the Mekong River in Laos.

[3] The presence of this species has not been definitely established in Malaysia.

[4] The presence of this species is suspected in peninsular Thailand.

[5] The shipment of 24 animals in 1980 consisted of rhesus monkeys (*Macaca mulatta*) obtained originally from India by a U.S. Army medical facility in Bangkok. The shipment was inspected and approved by the Royal Thai Forest Department (W. Nanakorn, personal communication).

* Species not indigenous to country are marked with an asterisk.

TABLE 3 (continued)

EXPORTING COUNTRY	SPECIES	1971	1972	1976	1977	1978	1979	1980
Angola	*Cercopithecus cephus*		2					
Barbados	*Cercopithecus aethiops*				6			40
Botswana	**Cercopithecus pygerythrus*	1	2					
	Galago senegalensis	108	90		20	16	24	24
Cameroon	*Arctocebus calabarensis*	1						
	Galago alleni	1						
	Galago demidovii	1						
Chad	*Erythrocebus patas*			84				
Congo	*Cercopithecus cephus*		1					
	Cercopithecus neglectus		4					
	Cercopithecus nictitans		2					
	Gorilla gorilla	1						
	**Papio (= Mandrillus) leucophaeus*		1					
Dahomey	*Cercopithecus mona*	8						
	Galago demidovii	150						
	Perodicticus potto	48						
Ethiopia	*Cercopithecus aethiops*	1,131	982	403	246	553	647	140
	Cercopithecus spp.	15						
	Colobus guereza		4					
	Papio anubis	22	80	10		87	110	20
	Papio cynocephalus			55				
	Papio hamadryas	20	58	43	30	22		
	Papio spp.						5	40
	Theropithecus gelada		3	10				
Ghana	*Cercocebus atys*	3	3					
	Cercopithecus aethiops	3	2	7	2		6	
	Cercopithecus diana	1						
	**Cercopithecus hamlyni*			1			3	
	Cercopithecus mona	5	6	2		1		1
	**Cercopithecus nictitans*	13	19	8				5
	Cercopithecus petaurista	2				3		
	Erythrocebus patas	13	7	2	5	1		2
	Galago senegalensis		3					
	Pan troglodytes	4						
	Papio anubis	2						
	**Papio hamadryas*		1					
	**Papio papio*		1	1				
	Unknown				7			
Ivory Coast	*Pan troglodytes*	10						
Kenya	*Cercopithecus aethiops*			2,649	1,300	470	587	795
	Cercopithecus ascanius	1						
	Cercopithecus neglectus	3						
	**Cercopithecus pygerythrus*	275	42					
	Colobus badius			85	12	8		
	Colobus guereza	7		27				
	**Colobus polykomos*						8	
	Colobus spp.	6				12		
	Galago (= Otolemur) crassicaudatus		20					
	Galago demidovii				30			
	Galago senegalensis	53	19	310	245	160	35	

TABLE 3 (continued)

EXPORTING COUNTRY	SPECIES	1971	1972	1976	1977	1978	1979	1980
	Pan troglodytes		1					
	Papio anubis	530	617	848	611	1,248	878	596
	Papio cynocephalus	231		588			46	16
	**Papio ursinus*				120	222		
	Papio spp.	27	20				212	
	Unknown			100				
Liberia	*Cercocebus atys*	1	8					
	**Cercopithecus ascanius*		3					
	Cercopithecus diana	4	3					
	Cercopithecus mona	1	8					
	Cercopithecus nictitans	3						
	Pan troglodytes	87	109					
	Perodicticus potto	2						
Madagascar	*Varecia variegata*	2						
	Microcebus murinus	2						
Nigeria	*Cercopithecus nictitans*	1						
	Erythrocebus patas	90	208	211	60	89	20	76
Senegal	**Papio anubis*	50	100					
	Papio papio	32	60	50		50		44
Sierra Leone	*Cercocebus* spp.			4				
	Cercopithecus aethiops	3		8				
	Cercopithecus diana	32	11					
	**Cercopithecus mona*	6						
	**Cercopithecus nictitans*	8						
	Cercopithecus petaurista			8				
	Pan troglodytes	103	117	177				
Somalia	*Cercopithecus aethiops*	1,080	1,110	552	438	1,080	1,278	1,456
	Galago senegalensis		46					
	**Papio anubis*		3					
South Africa	**Papio anubis*							25
	Papio spp.						2	
St. Kitts (West Indies)	*Cercopithecus aethiops*			41	188	195	90	59
Sudan	*Erythrocebus patas*	2						
Tanzania	**Cercopithecus pygerythrus*	330	1,046					
	Colobus guereza		3					
	Papio anubis	131	257					
	Papio cynocephalus	29	20					
	**Papio hamadryas*		30					
Togo	**Cercopithecus ascanius*				24			
	Galago senegalensis				28			
Uganda	*Cercopithecus neglectus*		31	8				
	**Cercopithecus nictitans*		9					
Zambia	**Papio hamadryas*						1	
Unknown	*Lemur catta*		1					
	Cercopithecus pygerythrus		90					
	Pan troglodytes	1						
	Papio anubis	16						
	Papio papio		70					

TABLE 3 (continued)

COUNTRY OF RE-EXPORT	SPECIES	1971	1972	1976	1977	1978	1979	1980
Canada	*Cercopithecus aethiops*			2				
	Colobus abyssinicus							2
	Gorilla gorilla							1
	Lemur catta	1						
	Lemur macaco							3
	Papio anubis		6	35				
	Papio hamadryas			2				
	Papio (= Mandrillus) leucophaeus						1	
	Papio p[illegible]			5				6
	Pan troglodytes		1					
Denmark	*Papio (= Mandrillus) sphinx*		4					
East Germany	*Cercopithecus hamlyni*					2		
Europe	*Erythrocebus patas*			96				
	Lemur macaco			6				
France	*Cheirogaleus major*					2		
	Lemur catta	2						
	Pan troglodytes			3			2	1
	Varecia variegata							1
Israel	*Gorilla gorilla*	1						
Japan	*Hapalemur griseus*					1		
	Lemur catta			1				
	Pan troglodytes							5
Mexico	*Pan troglodytes*							1
Netherlands	*Cercopithecus diana*		2					
	Papio hamadryas	2						
Switzerland	*Colobus abyssinicus*		2					
	Varecia variegata	1						1
Thailand	*Pan troglodytes*		5					
United Kingdom	*Cercopithecus mona*	1						
	Cercopithecus (= Allenopithecus) nigroviridis	3						
	Erythrocebus patas		6					
	Gorilla gorilla							2
	Pan troglodytes							1
Venezuela	*Pan troglodytes*						3	
West Germany	*Gorilla gorilla*	3						
	Lemur coronatus					2		
	Loris tardigradus	2						
	Miopithecus talapoin		5					
	Pan paniscus							1
	Pan troglodytes		1					
	Varecia variegata							2

* Species not indigenous to country are marked with an asterisk.

TABLE 3 (continued)

EXPORTING COUNTRY	SPECIES	1971	1972	1976	1977	1978	1979	1980
Bolivia	*Alouatta caraya*							6
	Aotus trivirgatus[1]			105	215	194	175	255
	**Ateles geoffroyi*							2
	Ateles paniscus							1
	Ateles spp.						12	1
	Callicebus moloch			21		11	5	22
	Callicebus torquatus							30
	Callithrix argentata			30			92	29
	**Callithrix jacchus*				178			14
	Callithrix spp.					98	540	
	Cebuella pygmaea							2
	Cebus albifrons			2				2
	Cebus apella			236	226	81	43	66
	**Cebus capucinus*				36			3
	"Saguinus argentata"[2]							20
	Saguinus imperator							30
	Saguinus labiatus			580	1,579	300	662	1,047
	**Saguinus mystax*				1			
	**Saguinus nigricollis*				50			
	Saguinus spp.			1,122			140	
	Saimiri sciureus		100	3,287	1,473	1,353	802	1,034
Brazil	*Callithrix geoffroyi*	24						
	Callithrix jacchus	3						1
	Callithrix penicillata	26						
	Cebus albifrons	37						
	Cebus apella							4
	Cebus capucinus	3						
	Lagothrix lagotricha	2						
	Leontopithecus rosalia							5
	Saguinus mystax			106				
	**Saguinus oedipus*	300						
	Saimiri sciureus	253						
Colombia	*Alouatta seniculus*	10	7					
	**Alouatta villosa*	12	22					1
	Aotus trivirgatus[1]	3,069	3,059					
	Ateles belzebuth	14	26					
	Ateles fusciceps	129	58					
	**Ateles geoffroyi*	612	855					
	Ateles spp.	15	3					
	Callicebus moloch	9	14					
	Callicebus spp.	82	5					
	**Callithrix chrysoleuca*[3]		19					
	Callithrix spp.		10					
	Cebuella pygmaea	127	102					
	Cebus albifrons	1,343	2,152					
	Cebus apella	131	172					
	Cebus capucinus	928	1,001					
	**Cebus nigrivittatus*	22						
	**Chiropotes satanas*		3					
	Lagothrix lagotricha	442	225					
	Pithecia monachus	15	6					
	**Saguinus mystax*	735	611					
	Saguinus nigricollis	982	1,665					
	Saguinus oedipus	300	2,344					
	Saimiri sciureus	6,276	4,609				8	
	Unknown		33					

TABLE 3 (continued)

EXPORTING COUNTRY	SPECIES	1971	1972	1976	1977	1978	1979	1980
Costa Rica	*Ateles geoffroyi*	6						
	**Callicebus moloch*							1
	**Cebus apella*					4		
	Cebus capucinus	1						
Ecuador	*Aotus trivirgatus*[1]			1				
	Ateles paniscus		1					
	Cebus albifrons	4	32					
	**Cebus capucinus*	28	20					
	Lagothrix lagotricha	1						
El Salvador	**Aotus trivirgatus*[1]			11				
Guatemala	*Cebus capucinus*		1					
	**Saimiri sciureus*						8	82
Guyana	**Cacajao rubicundus*			1				
	**Cebus albifrons*	27	37	15		7		
	Cebus apella	4		32		15	116	36
	**Cebus capucinus*	10	26					
	Cebus nigrivittatus					20	2	
	Cebus spp.					14		
	**Pithecia monachus*	5	6					
	Pithecia pithecia	1						18
	Saguinus midas			4				4
	**Saguinus nigricollis*	8						
	Saimiri sciureus	424	326	2,096		633	299	578
Honduras	**Alouatta villosa*	2	9					
	Ateles geoffroyi	10	9	1				
	**Ateles paniscus*			11				
	**Cebus albifrons*			1				
	Cebus capucinus	20	13	4				
	**Saguinus tamarin*[4]	1						
Nicaragua	**Alouatta villosa*	33						
	Ateles geoffroyi	870	738	109	3			
	**Ateles paniscus*			47				
	Ateles spp.			7	3			
	**Cebus albifrons*			2				
	**Cebus apella*			20				
	Cebus capucinus	142	120	6	7			
	**Saimiri oerstedii*	2	4					
	**Saimiri sciureus*				1			
Panama	**Alouatta villosa*		2					
	Aotus trivirgatus[1]	4		177	198	473	2	51
	Ateles fusciceps		12			15		
	Ateles geoffroyi	2			17	1		
	**Ateles paniscus*					6		
	Ateles spp.			6	3			
	**Callithrix geoffroyi*					1		
	**Callithrix jacchus*				4			
	**Cebuella* spp.					4		
	**Cebus albifrons*			6	9	19		
	**Cebus apella*				30			
	Cebus capucinus	1	13	3	3	12		
	Saguinus geoffroyi	12	11	6		14	6	
	**Saguinus oedipus*			94		12		
	Saimiri oerstedii				6			
	**Saimiri sciureus*				4			

TABLE 3 (continued)

EXPORTING COUNTRY	SPECIES	1971	1972	1976	1977	1978	1979	1980
Paraguay	*Alouatta caraya*	18	4					3
	Aotus trivirgatus[1]	1	1	1,226				164
	Ateles paniscus			2				
	Callicebus moloch	1	4					
	**Callithrix aurita*		48					
	**Callithrix jacchus*		9			150	464	150
	**Callithrix penicillata*						19	
	**Cebus albifrons*	69						
	Cebus apella	497	697	31	40			124
	**Cebus capucinus*			17				
	**Cebus nigrivittatus*	10						
	Cebus spp.	196	102					
	**Saguinus leucopus*			2				
	**Saguinus oedipus*		50	1,442				
	**Saimiri sciureus*		10					
	Unknown		30					
Peru	*Alouatta seniculus*	1						
	Aotus trivirgatus[1]	654	467					
	Ateles belzebuth	27	8					
	**Ateles geoffroyi*	117	239					
	Ateles paniscus	82	121					
	Ateles spp.	5						
	Callicebus moloch	30	6					
	Callicebus spp.	52	37					
	Callimico goeldii		4					
	Cebuella pygmaea	39	9				50	50
	Cebus albifrons	741	555					
	Cebus apella	1,404	1,106					
	**Cebus capucinus*		15					
	**Cebus nigrivittatus*[5]	1						
	**Chiropotes satanas*		3					
	Lagothrix lagotricha	1,781	1,900					
	Pithecia monachus	63	18					
	Saguinus fuscicollis				95	210	265	150
	Saguinus illigeri	293	50					
	Saguinus labiatus						30	
	Saguinus mystax	128	453	250	255	400	320	350
	Saguinus nigricollis	797	268					
	**Saguinus oedipus*	75	25					
	Saimiri sciureus	22,924	20,248		320	250	175	75
	Unknown	3						
Unknown	*Cebus* spp.		1					
	Ateles spp.			2				

COUNTRY OF RE-EXPORT								
Belgium	*Saguinus labiatus*						98	
Canada	*Ateles* spp.			4				
	Saguinus midas							6
	Saguinus nigricollis			12				
	Saimiri sciureus			4				
Europe	*Chiropotes albinasus*			2				
	Saguinus mystax			1				
	Saimiri sciureus			20				
Ghana[6]	*Aotus trivirgatus*[1]		6					

TABLE 3 (continued)

COUNTRY OF RE-EXPORT	SPECIES	1971	1972	1976	1977	1978	1979	1980
Japan	*Saimiri sciureus*			3				1
Netherlands	*Aotus trivirgatus*[1]			53				
	Callicebus moloch							1
	Callithrix jacchus							12
	Saguinus oedipus			121				
	Unknown			79				
United Kingdom	*Callithrix jacchus*				32			
	Callithrix spp.				48			
	Saguinus fuscicollis				3			
West Germany	*Callithrix* spp.						90	
	Saguinus imperator						1	

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[1] The genus *Aotus* recently has been divided into 9 species. Importers listed only *Aotus trivirgatus* on import documents.

[2] *Saguinus argentata* is not a real species and these imports are probably *Callithrix argentata*.

[3] *Callithrix chrysoleuca* is now considered a subspecies of *Callithrix humeralifer*.

[4] The correct scientific name for *Saguinus tamarin* is *Saguinus midas niger*.

[5] *Saguinus illigeri* is actually a subspecies of *Saguinus fuscicollis*.

[6] Probably mistaken in report for Guyana.

*Species not indigenous to country are marked with an asterisk.

TABLE 4
SHIPMENT-RELATED PRIMATE MORTALITIES
1978

SPECIES	COUNTRY OF EXPORT	TOTAL NUMBER IMPORTED[1]		DEAD-ON-ARRIVAL (PERCENT)		DEATHS FROM DISEASE WITHIN 90 DAYS[2] (PERCENT)		TOTAL MORTALITY (PERCENT)	
ASIAN									
Tupaia glis[3]	Thailand	1320	(12)	563	(42.7%)	219	(16.6%)	782	(59.2%)
Macaca arctoides	Malaysia	14	(1)	1	(7.1%)	0		1	(7.1%)
Macaca fascicularis	Indonesia	5281	(77)	183	(3.5%)	809	(15.3%)	992	(18.8%)
	Malaysia	5279	(70)	113	(2.1%)	957	(18.1%)	1070	(20.3%)
	Philippines	3333	(33)	194	(5.8%)	313	(9.4%)	507	(15.2%)
	Subtotal	13,893	(180)	490	(3.5%)	2,079	(15.0%)	2,569	(18.5%)
Macaca mulatta	Bangladesh	101	(5)	3	(3.0%)	7	(6.9%)	10	(9.9%)
	Belgium[4]	146	(1)	0		7	(4.8%)	7	(4.8%)
	India	4,949	(37)	12	(0.2%)	209	(4.2%)	221	(4.4%)
	Netherlands	12	(1)	0		0		0	
	Subtotal	5,238	(44)	15	(0.3%)	223	(4.3%)	238	(4.5%)
Macaca nemestrina	Indonesia	232	(15)	9	(3.9%)	35	(15.1%)	44	(19.0%)
	Malaysia	497	(20)	12	(2.4%)	66	(13.3%)	78	(15.7%)
	Subtotal	729	(35)	21	(2.9%)	101	(13.9%)	122	(16.7%)
Presbytis cristata	Indonesia	26	(2)	6	(23.1%)	17	(65.4%)	23	(88.5%)
TOTAL		21,220	(274)	1,096	(5.2%)	2,639	(12.4%)	3,735	(17.6%)
AFRICAN									
Galago senegalensis	Botswana	16	(1)	0		1	(6.3%)	1	(6.3%)
	Kenya	160	(4)	32	(20.0%)	9	(5.6%)	41	(25.6%)
	Subtotal	176	(5)	32	(18.2%)	10	(5.7%)	42	(23.9%)
Cercopithecus aethiops	Ethiopia	483	(7)	108	(22.4%)	112	(23.2%)	220	(45.6%)
	Kenya	460	(10)	30	(6.5%)	52	(11.3%)	82	(17.8%)
	Somalia	1,066	(24)	56	(5.3%)	78	(7.3%)	134	(12.6%)
	St. Kitts, WI	64	(8)	1	(1.6%)	0		1	(1.6%)
	Subtotal	2,073	(49)	195	(9.4%)	242	(11.7%)	437	(21.1%)
Cercopithecus mona	Ghana	1	(1)	0		0		0	
Cercopithecus petaurista	Ghana	3	(1)	0		0		0	
Erythrocebus patas	Ghana	1	(1)	0		0		0	
	Nigeria	89	(4)	1	(1.1%)	4	(4.5%)	5	(5.6%)
	Subtotal	90	(5)	1	(1.1%)	4	(4.4%)	5	(5.6%)
Papio anubis	Ethiopia	87	(3)	4	(4.6%)	15	(17.2%)	19	(21.8%)
	Kenya	1,248	(40)	43	(3.5%)	26	(2.1%)	69	(5.5%)
	Subtotal	1,335	(43)	47	(3.5%)	41	(3.1%)	88	(6.6%)
Papio hamadryas	Ethiopia	22	(2)	0		0		0	
Papio papio	Senegal	50	(1)	0		1	(2.0%)	1	(2.0%)
Colobus spp.	Kenya	20	(1)	2	(10.0%)	0		2	(10.0%)
TOTAL		3,770	(107)	277	(7.4%)	298	(7.9%)	575	(15.3%)

TABLE 4 (continued)

SPECIES	COUNTRY OF EXPORT	TOTAL NUMBER IMPORTED[1]		DEAD-ON-ARRIVAL (PERCENT)		DEATHS FROM DISEASE[2] WITHIN 90 DAYS (PERCENT)		TOTAL MORTALITY (PERCENT)	
NEOTROPICAL									
Callithrix jacchus	Bolivia	98	(1)	3	(3.1%)	0		3	(3.1%)
	Paraguay	150	(1)	(?)		(?)		84	(56.0%)
Saguinus fuscicollis	Peru	82	(2)	0		6	(7.3%)	6	(7.3%)
Saguinus geoffroyi	Panama	14	(4)	0		2	(14.3%)	2	(14.3%)
Saguinus labiatus	Bolivia	200	(2)	6	(3.0%)	0		6	(3.0%)
Saguinus mystax	Peru	173	(4)	1	(0.6%)	59	(34.1%)	60	(34.7%)
Saguinus oedipus	Panama	12	(1)	0		1	(8.3%)	1	(8.3%)
Saguinus spp.[5]	Peru	40	(1)	0		0		0	
Aotus trivirgatus[6]	Bolivia	194	(14)	12	(6.2%)	25	(12.9%)	37	(19.1%)
	Panama	473	(16)	19	(4.0%)	195	(41.2%)	214	(45.2%)
	Subtotal	667	(30)	31	(4.7%)	220	(33.0%)	251	(37.6%)
Ateles fusciceps	Panama	15	(5)	0		2	(13.3%)	2	(13.3%)
Ateles geoffroyi	Panama	1	(1)	0		0		0	
Callicebus moloch	Bolivia	11	(1)	0		2	(18.2%)	2	(18.2%)
Cebus albifrons	Guyana	7	(1)	0		0		0	
Cebus apella	Bolivia	81	(10)	3	(3.7%)	12	(14.8%)	15	(18.5%)
	Costa Rica	2	(1)	0		0		0	
	Guyana	15	(1)	0		2	(13.3%)	2	(13.3%)
	Subtotal	98	(12)	3	(3.1%)	14	(14.3%)	17	(17.4%)
Cebus capucinus	Costa Rica	2	(1)	0		0		0	
	Panama	12	(3)	0		4	(33.3%)	4	(33.3%)
	Subtotal	14	(4)	0		4	(28.6%)	4	(28.6%)
Saimiri sciureus	Bolivia	1,353	(18)	74	(5.5%)	214	(15.8%)	288	(21.3%)
	Guyana	633	(8)	14	(2.2%)	156	(24.6%)	170	(26.9%)
	Subtotal	1,986	(26)	88	(4.4%)	370	(18.6%)	458	(23.1%)
TOTAL		3,568	(96)	155	(4.3%)	739	(20.7%)	896	(25.1%)
GRAND TOTAL		28,558	(477)	1,528	(5.4%)	3,676	(12.9%)	5,206	(18.2%)

TABLE 4
SHIPMENT-RELATED PRIMATE MORTALITIES
1979

SPECIES	COUNTRY OF EXPORT	TOTAL NUMBER IMPORTED[1]		DEAD-ON-ARRIVAL (PERCENT)		DEATHS FROM DISEASE WITHIN 90 DAYS[2] (PERCENT)		TOTAL MORTALITY (PERCENT)	
ASIAN									
Tupaia glis[3]	Thailand	505	(6)	202	(40.0%)	28	(5.5%)	230	(45.5%)
Nycticebus coucang	Thailand	10	(1)	0		0		0	
Macaca arctoides	Netherlands	12	(1)	0		0		0	

TABLE 4 (continued)

SPECIES	COUNTRY OF EXPORT	TOTAL NUMBER IMPORTED[1]		DEAD-ON-ARRIVAL (PERCENT)		DEATHS FROM DISEASE[2] WITHIN 90 DAYS (PERCENT)		TOTAL MORTALITY (PERCENT)	
Macaca fascicularis	Indonesia	6,041	(78)	470	(7.8%)	547	(9.1%)	1,017	(16.8%)
	Malaysia	3,853	(56)	58	(1.5%)	559	(14.5%)	617	(16.0%)
	Philippines	4,628	(47)	271	(5.9%)	313	(6.8%)	584	(12.6%)
	Subtotal	14,522	(181)	799	(5.5%)	1,419	(9.8%)	2,218	(15.3%)
Macaca mulatta	Bangladesh	226	(5)	3	(1.3%)	9	(4.0%)	12	(5.3%)
	Canada	18	(1)	0		0		0	
	Subtotal	244	(6)	3	(1.2%)	9	(3.7%)	12	(4.9%)
Macaca nemestrina	Indonesia	90	(5)	2	(2.2%)	4	(4.4%)	6	(6.7%)
	Malaysia	194	(11)	0		12	(6.2%)	12	(6.2%)
	Subtotal	284	(16)	2	(0.7%)	16	(5.6%)	18	(6.3%)
Macaca nigra	Canada	1	(1)	0		0		0	
Presbytis obscura	Netherlands	1	(1)	0		0		0	
TOTAL		15,579	(213)	1,006	(6.5%)	1,472	(9.5%)	2,478	(15.9%)
AFRICAN									
Galago senegalensis	Botswana	24	(2)	1	(4.2%)	1	(4.2%)	2	(8.3%)
Galago spp.	Kenya	35	(2)	3	(8.6%)	5	(14.3%)	8	(22.9%)
Cercopithecus aethiops	Ethiopia	647	(12)	199	(30.8%)	112	(17.3%)	311	(48.1%)
	Kenya	587	(13)	37	(6.3%)	125	(21.3%)	162	(27.6%)
	Somalia	1278	(23)	99	(7.8%)	187	(14.6%)	286	(22.4%)
	St. Kitts, WI	90	(9)	0		0		0	
	Unknown[7]	2	(1)	0		0		0	
	Subtotal	2,604	(58)	335	(12.9%)	424	(16.3%)	759	(29.2%)
Cercopithecus petaurista	Ghana	3	(1)	0		0		0	
Erythrocebus patas	Nigeria	20	(1)	1	(5.0%)	1	(5.0%)	2	(10.0%)
Papio anubis	Ethiopia	50	(2)	3	(6.0%)	4	(8.0%)	7	(14.0%)
	Kenya	365	(8)	11	(3.0%)	17	(4.7%)	28	(7.7%)
	Subtotal	415	(10)	14	(3.4%)	21	(5.1%)	35	(8.4%)
Papio cynocephalus[8]	Kenya	24	(1)	0		2	(8.3%)	2	(8.3%)
Papio (= Mandrillus) leucophaeus	Canada	1	(1)	0		0		0	
Papio spp.	Ethiopia	65	(2)	0		0		0	
	Kenya	747	(21)	4	(0.5%)	4	(0.5%)	8	(1.1%)
	Subtotal	812	(23)	4	(0.5%)	4	(0.5%)	8	(1.0%)
Pan troglodytes	France	2	(1)	0		0		0	
TOTAL		3,940	(100)	358	(9.1%)	458	(11.6%)	816	(20.7%)
NEOTROPICAL									
Callithrix argentata	Bolivia	91	(2)	5	(5.5%)	59	(64.8%)	64	(70.3%)
Callithrix jacchus[9]	Paraguay	464	(5)	4	(0.9%)	134	(28.9%)	138	(29.7%)

TABLE 4 (continued)

SPECIES	COUNTRY OF EXPORT	TOTAL NUMBER IMPORTED[1]		DEAD-ON-ARRIVAL (PERCENT)		DEATHS FROM DISEASE WITHIN 90 DAYS[2] (PERCENT)		TOTAL MORTALITY (PERCENT)	
Callithrix penicillata	Paraguay	19	(1)	0		11	(57.9%)	11	(57.9%)
Cebuella pygmaea	Peru	16	(1)	0		3	(18.8%)	3	(18.8%)
Saguinus fuscicollis	Peru	60	(2)	1	(1.7%)	3	(5.0%)	4	(6.7%)
Saguinus geoffroyi	Panama	6	(1)	0		0		0	
Saguinus imperator	West Germany	1	(1)	0		0		0	
Saguinus labiatus	Bolivia	113	(1)	8	(7.1%)	7	(6.2%)	15	(13.3%)
Callitrichidae spp.	Bolivia	540	(5)	3	(0.6%)	0		3	(0.6%)
	West Germany	90	(1)	0		20	(22.2%)	20	(22.2%)
	Subtotal	630	(6)	3	(0.5%)	20	(3.2%)	23	(3.7%)
Aotus trivirgatus[6]	Bolivia	175	(11)	3	(1.7%)	18	(10.3%)	21	(12.0%)
	Panama	2	(1)	0		0		0	
	Subtotal	177	(12)	3	(1.7%)	18	(10.2%)	21	(11.9%)
Cebus apella	Bolivia	10	(1)	0		2	(20.0%)	2	(20.0%)
	Guyana	49	(3)	0		5	(10.2%)	5	(10.2%)
	Subtotal	59	(4)	0		7	(11.9%)	7	(11.9%)
Cebus nigrivittatus	Guyana	2	(2)	0		0		0	
Cebus spp.	Bolivia	43	(3)	4	(9.3%)	1	(2.3%)	5	(11.6%)
	Guyana	5	(1)	2	(40.0%)	0		2	(40.0%)
	Subtotal	48	(4)	6	(12.5%)	1	(2.1%)	7	(14.6%)
Saimiri sciureus	Bolivia	764	(8)	49	(6.4%)	108	(14.1%)	157	(20.6%)
	Guatemala[10]	8	(1)	0		0		0	
	Guyana	299	(3)	6	(2.0%)	68	(22.7%)	74	(24.8%)
	Subtotal	1,071	(12)	55	(5.1%)	176	(16.4%)	231	(21.6%)
TOTAL		2,757	(54)	85	(3.1%)	439	(15.9%)	524	(19.0%)
GRAND TOTAL		22,276	(367)	1,449	(6.5%)	2,369	(10.6%)	3,818	(17.1%)

[1] Number of shipments is indicated in parentheses.
[2] This category includes tuberculosis-associated deaths.
[3] The family Tupaiidae is classified within the order Primates throughout this chapter to agree with the procedure used by agencies of the U.S. government.
[4] Country of origin is identified as India.
[5] This entry is derived from a mixed shipment of *Saguinus fuscicollis* and *S. mystax*.
[6] The genus *Aotus* recently has been divided into 9 species. Importers have been listing only *Aotus trivirgatus* on import documents.
[7] The small size of the shipment suggests that it may have been from St. Kitts, West Indies, or a re-export.
[8] Species identified as *Papio cynocephalus anubis*.
[9] One shipment is identified as *Callicebus jacchus*.
[10] Country of origin is identified as Colombia.

Source: Data derived from U.S. Public Health Service, Center for Disease Control Primate Import Document 4.487B 8-75.

TABLE 5
EXPORTS, INCLUDING RE-EXPORTS, OF PRIMATES BY THE UNITED STATES FOR THE PERIOD 1978-1980

IMPORTING COUNTRY	SPECIES	CDC[a] 1978	FWS 1978	CDC[b] 1979	FWS 1979	FWS 1980
AUSTRALIA	*Macaca fascicularis*			49		
	Saimiri sciureus					2
	Subtotal			49		2
BELGIUM	*Macaca fascicularis*	48				40
	Cercopithecus aethiops			30		60
	Subtotal	48		30		100
BRAZIL	*Cercopithecus aethiops*			10		3
CANADA	*Aotus trivirgatus*	2				3
	Ateles fusciceps	6				
	Ateles geoffroyi					2[d]
	Callithrix jacchus			80		
	Cebus albifrons					2[d]
	Cebus apella	11				3[g]
	Cebus capucinus	2				
	Cercopithecus aethiops	303		425		574
	Colobus polykomos				1	
	Galago senegalensis	4				
	Macaca fascicularis	1,693		2,104		1,100
	Macaca mulatta	780				50[d]
	Macaca nemestrina	7				
	Papio anubis	28		1		25
	Papio papio					7[d]
	Papio spp.			15		
	Saguinus labiatus	94				
	Saimiri sciureus	78		10		120
	Subtotal	3,008		2,635	1	1,886
COLOMBIA	*Galago senegalensis*	4				
	Macaca mulatta					2[d]
	Subtotal	4				2
FRANCE	Callitrichidae spp.			30		
	Cercopithecus aethiops			32		23
	Galago senegalensis	12				
	Macaca fascicularis	2,004		652[k]		1,255
	Macaca mulatta	22				48[d]
	Macaca nemestrina	24				
	Papio anubis	48		52		155
	Papio hamadryas	10				
	Papio spp.			4		
	Saguinus labiatus				24	
	Saimiri sciureus	53		10		37
	Tupaia glis	15				19
	Subtotal	2,188		780	24	1,537
GUATEMALA	*Erythrocebus patas*	1				
HONG KONG	*Pongo pygmaeus*					2[g]
HUNGARY	*Macaca mulatta*		5			
ITALY	*Cercopithecus aethiops*	140		166[l]		
	Macaca fascicularis	267		473		269
	Subtotal	407		639		269
JAPAN	*Aotus trivirgatus*					5
	Ateles belzebuth					2[d]
	Ateles geoffroyi					3[d]
	Ateles paniscus					2[j]
	Cebuella pygmaea					6[c]

TABLE 5 (continued)

IMPORTING COUNTRY	SPECIES	CDC[a] 1978	FWS 1978	CDC[b] 1979	FWS 1979	FWS 1980
	Cebus albifrons					2[d]
	Cercopithecus aethiops			44		
	Macaca fascicularis	61		18		
	Macaca mulatta	51				
	Pan troglodytes				1[f]	5[d]
	Saguinus mystax				20[c]	50[c]
	Saimiri sciureus	8				
	Subtotal	120		62	21	75
MEXICO	*Ateles geoffroyi*					1
	Cercopithecus mona					1
	Cercopithecus spp.					3
	Erythrocebus patas					2
	Lemur catta					2[f]
	Macaca arctoides					1[h]
	Macaca nemestrina					1[d]
	Macaca nigra					1[d]
	Pan troglodytes					6[h]
	Papio anubis					1[h]
	Papio cynocephalus					1[h]
	Papio hamadryas					1[h]
	Papio (= Mandrillus) sphinx					1[d]
	Saimiri sciureus					5[f]
	Theropithecus gelada					1[h]
	Subtotal					28
SINGAPORE	*Callithrix jacchus*				3[f]	
SOUTH AFRICA	*Macaca nigra*					1[d]
SPAIN	*Macaca fascicularis*			10		
SWEDEN	*Callithrix jacchus*					14
	Cebus apella					13
	Subtotal					27
SWITZERLAND	*Ateles fusciceps*	2				
	Cebus apella				10	18
	Subtotal	2			10	18
UNITED KINGDOM	*Aotus trivirgatus*					14
	Cebus apella					6
	Erythrocebus patas	24				
	Leontopithecus rosalia					2[d]
	Macaca fascicularis			31		
	Saguinus labiatus		26			
	Saguinus oedipus					10[d]
	Subtotal	24	26	31		32
U.S.S.R.	*Saguinus mystax*				10[c]	50[c]
WEST GERMANY	*Cebuella pygmaea*					5[c]
	Galago senegalensis		10			
	Lemur catta					4[d]
	Macaca fascicularis	65		253		195
	Macaca mulatta					4[e]
	Pongo pygmaeus				1[d]	
	Saguinus fuscicollis				58[c]	24[c]
	Saguinus mystax				5[c]	
	Saimiri sciureus				30[c]	16[c]
	Subtotal	65	10	253	94	248
TOTAL		5,867	41	4,499	163	4,280

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[a] Re-export data are derived from documents for shipments arriving in the United States during the calendar year 1978. Re-exports made in January-March 1978 may be excluded, and re-exports made in January-March 1979 may be included.

TABLE 5 (continued)

[b] Re-export data are derived from documents for shipments arriving in the United States during the calendar year 1979. Re-exports made in January-March 1979 may be excluded. Numbers do not include any re-exports from 70 shipments arriving in the United States in October-December 1979 from which at least 3,061 primates were transferred to user facilities.

[c] Country of origin identified as Peru. U.S. exporter identified as Pan American Health Organization (PAHO)/U.S. Department of State

[d] Country of origin identified as United States or captive-born.

[e] Country of origin identified as Canada.

[f] Country of origin undesignated.

[g] Country of origin undesignated for one of the total.

[h] Country of origin undesignated; identified as circus act.

[i] Country of origin identified as Canada for 14 of the total.

[j] Country of origin identified as United States for one of the total.

[k] 13 of the total may have been re-exported in either 1979 or 1980.

[l] 40 of the total may have been re-exported in either 1979 or 1980.

Source: Data derived from U.S. Public Health Service, Center for Disease Control, Primate Import Document 4.487B 8-75 for 1978-1979 and U.S. Fish and Wildlife Service, Declaration for Exportation of Wildlife Form 3-177 for 1978-1980.

TABLE 6

PRIMATES IMPORTED INTO THE UNITED STATES IN 1978 AND 1979 AVAILABLE FOR TRANSFER TO U.S. FACILITIES.

1978

SPECIES	TOTAL NUMBER IMPORTED[1]		SHIPMENT-RELATED MORTALITIES[2] (PERCENT OF TOTAL IMPORTS)		DEATHS DUE TO SCIENTIFIC USE[3] (PERCENT OF TOTAL IMPORTS)		RE-EXPORTS[4] (PERCENT OF TOTAL IMPORTS)		TOTAL NUMBER USABLE PRIMATES (PERCENT OF TOTAL IMPORTS)	
ASIAN										
Tupaia glis[5]	1,320	(12)	782	(59.2%)	8	(0.6%)	15	(1.1%)	515	(39.0%)
Macaca arctoides	14	(1)	1	(7.1%)	0		0		13	(92.9%)
Macaca fascicularis	13,893	(180)	2,569	(18.5%)	305	(2.2%)	4,138	(29.8%)	6,881	(49.5%)
Macaca mulatta	5,238	(44)	238	(4.5%)	9	(0.2%)	853	(16.3%)	4,138	(79.0%)
Macaca nemestrina	729	(35)	122	(16.7%)	5	(0.7%)	31	(4.3%)	571	(78.3%)
Presbytis cristata	26	(2)	23	(88.5%)	0		0		3	(11.5%)
TOTAL	21,220	(274)	3,735	(17.6%)	327	(1.5%)	5,037	(23.7%)	12,121	(57.1%)
AFRICAN										
Galago senegalensis	176	(5)	42	(23.9%)	1	(0.6%)	20	(11.4%)	113	(64.2%)
Cercopithecus aethiops	2,073	(49)	437	(21.1%)	47	(2.3%)	443	(21.4%)	1,146	(55.3%)
Cercopithecus mona	1	(1)	0		0		0		1	(100%)
Cercopithecus petaurista	3	(1)	0		0		0		3	(100%)
Erythrocebus patas	90	(5)	5	(5.6%)	0		25	(27.8%)	60	(66.8%)
Papio anubis	1,335	(43)	88	(6.6%)	2	(0.2%)	76	(5.7%)	1,169	(87.6%)
Papio hamadryas	22	(2)	0		0		10	(45.5%)	12	(54.6%)
Papio papio	50	(1)	1	(2.0%)	0		0		49	(98.0%)
Colobus spp.	20	(1)	2	(10.0%)	0		0		18	(90.0%)
TOTAL	3,770	(107)	575	(15.3%)	50	(1.3%)	574	(15.2%)	2,571	(68.2%)
NEOTROPICAL										
Callithrix jacchus	248	(2)	87	(35.1%)	0		0		161	(64.9%)
Saguinus fuscicollis	82	(2)	6	(7.3%)	0		0		76	(92.7%)
Saguinus geoffroyi	14	(4)	2	(14.3%)	0		0		12	(85.7%)
Saguinus labiatus	200	(2)	6	(3.0%)	0		94	(47.0%)	100	(50.0%)
Saguinus mystax	173	(4)	60	(34.7%)	0		0		113	(65.3%)
Saguinus oedipus	12	(1)	1	(8.3%)	0		0		11	(91.7%)
Saguinus spp.[6]	40	(1)	0		0		0		40	(100%)
Aotus trivirgatus	667	(30)	251	(37.6%)	0		2	(0.3%)	414	(62.1%)
Ateles fusciceps	15	(5)	2	(13.3%)	0		8	(53.3%)	5	(33.3%)

TABLE 6 (continued)

SPECIES	TOTAL NUMBER IMPORTED[1]		SHIPMENT-RELATED MORTALITIES[2] (PERCENT OF TOTAL IMPORTS)		DEATHS DUE TO SCIENTIFIC USE[3] (PERCENT OF TOTAL IMPORTS)		RE-EXPORTS[4] (PERCENT OF TOTAL IMPORTS)		TOTAL NUMBER USABLE PRIMATES (PERCENT OF TOTAL IMPORTS)	
Ateles geoffroyi	1	(1)	0		0		0		1	(100%)
Callicebus moloch	11	(1)	2	(18.2%)	0		0		9	(81.8%)
Cebus albifrons	7	(1)	0		0		0		7	(100%)
Cebus apella	98	(12)	17	(17.4%)	1	(1.0%)	11	(11.2%)	69	(70.4%)
Cebus capucinus	14	(4)	4	(28.6%)	0		2	(14.3%)	8	(57.1%)
Saimiri sciureus	1,986	(26)	458	(23.1%)	40	(2.0%)	139	(7.0%)	1,349	(67.9%)
TOTAL	3,568	(96)	896	(25.1%)	41	(1.2%)	256	(7.2%)	2,375	(66.6%)
GRAND TOTAL	28,558	(477)	5,206	(18.2%)	418	(1.5%)	5,867	(20.5%)	17,066	(59.8%)
1979										
ASIAN										
Tupaia glis[5]	505	(6)	230	(45.5%)	1	(0.2%)	0		274	(54.3%)
Nycticebus coucang	10	(1)	0		0		0		10	(100%)
Macaca arctoides	12	(1)	0		0		0		12	(100%)
Macaca fascicularis	14,522	(181)	2,218	(15.3%)	392	(2.7%)	3,590	(24.7%)	*8,322	(57.3%)
Macaca mulatta	244	(6)	12	(4.9%)	0		0		232	(95.1%)
Macaca nemestrina	284	(16)	18	(6.3%)	1	(0.4%)	0		*265	(93.3%)
Macaca nigra	1	(1)	0		0		0		1	(100%)
Presbytis obscura	1	(1)	0		0		0		1	(100%)
TOTAL	15,579	(213)	2,478	(15.9%)	394	(2.5%)	3,590	(23.0%)	*9,117	(58.5%)
AFRICAN										
Galago senegalensis	24	(2)	2	(8.3%)	0		0		22	(91.7%)
Galago spp.	35	(2)	8	(22.9%)	0		0		27	(77.1%)
Cercopithecus aethiops	2,604	(58)	759	(29.2%)	40	(1.5%)	707	(27.2%)	*1,098	(42.2%)
Cercopithecus petaurista	3	(1)	0		0		0		3	(100%)
Erythrocebus patas	20	(1)	2	(10.0%)	0		0		18	(90.0%)
Papio anubis	415	(10)	35	(8.4%)	2	(0.5%)	53	(12.8%)	325	(78.3%)
Papio cynocephalus[7]	24	(1)	2	(8.3%)	0		0		22	(91.7%)
Papio (= Mandrillus) leucophaeus	1	(1)	0		0		0		1	(100%)
Papio spp.	812	(23)	8	(1.0%)	1	(0.1%)	19	(2.3%)	*784	(96.6%)
Pan troglodytes	2	(1)	0		0		0		2	(100%)
TOTAL	3,940	(100)	816	(20.7%)	43	(1.1%)	779	(19.8%)	*2,302	(58.4%)

TABLE 6 (continued)

SPECIES	TOTAL NUMBER IMPORTED[1]		SHIPMENT-RELATED MORTALITIES[2] (PERCENT OF TOTAL IMPORTS)		DEATHS DUE TO SCIENTIFIC USE[3] (PERCENT OF TOTAL IMPORTS)		RE-EXPORTS[4] (PERCENT OF TOTAL IMPORTS)		TOTAL NUMBER USABLE PRIMATES (PERCENT OF TOTAL IMPORTS)	
NEOTROPICAL										
Callithrix argentata	91	(2)	64	(70.3%)	0		0		27	(29.7%)
Callithrix jacchus[8]	464	(5)	138	(29.7%)	0		80	(17.2%)	*246	(53.0%)
Callithrix penicillata	19	(1)	11	(57.9%)	0		0		*8	(42.1%)
Cebuella pygmaea	16	(1)	3	(18.8%)	0		0		13	(81.3%)
Saguinus fuscicollis	60	(2)	4	(6.7%)	0		0		56	(93.3%)
Saguinus geoffroyi	6	(1)	0		0		0		6	(100%)
Saguinus imperator	1	(1)	0		0		0		1	(100%)
Saguinus labiatus	113	(1)	15	(13.3%)	0		0		98	(86.7%)
Callitrichidae spp.	630	(6)	23	(3.7%)	0		30	(4.8%)	*577	(91.6%)
Aotus trivirgatus	177	(12)	21	(11.9%)	0		0		*156	(88.1%)
Cebus apella	59	(4)	7	(11.9%)	0		0		52	(88.1%)
Cebus nigrivittatus	2	(2)	0		0		0		2	(100%)
Cebus spp.	48	(4)	7	(14.6%)	0		0		41	(85.4%)
Saimiri sciureus	1,071	(12)	231	(21.6%)	3	(0.3%)	20	(1.9%)	*817	(76.3%)
TOTAL	2,757	(54)	524	(19.0%)	3	(0.1%)	130	(4.7%)	*2,100	(76.2%)
GRAND TOTAL	22,276	(367)	3,818	(17.1%)	440	(2.0%)	4,499	(20.2%)	*13,519	(60.7%)

* May be overestimate.

[1] Data derived from Table 4. Number of shipments is indicated in parentheses.

[2] Data derived from Total Mortality, Table 4.

[3] Sacrifice of primates on the premises of animal dealers for tissue samples.

[4] Data derived from Table 5. Statistics for 1979 do not include any re-exports from 70 shipments arriving in the United States in October-December 1979 from which at least 3,061 primates were transferred. Total numbers of usable primates which may be overestimates are asterisked(*).

[5] The family Tupaiidae is classified within the order Primates throughout this chapter to agree with the procedure used by agencies of the U.S. government.

[6] This entry is derived from a mixed shipment of *Saguinus fuscicollis* and *S. mystax*.

[7] Species identified as *Papio cynocephalus anubis*.

[8] One shipment is identified as *Callicebus jacchus*.

Source: Data recorded on U.S. Public Health Service, Center for Disease Control Primate Import Document 4.487B 8-75.

TABLE 7
U.S. IMPORTATIONS OF PRIMATES AS HUNTING TROPHIES IN 1980

EXPORTING COUNTRY	SPECIES	QUANTITY	PERCENT OF TOTAL
BOTSWANA	*Papio ursinus*	4	4.4%
CENTRAL AFRICAN REPUBLIC	*Colobus* sp.	1	1.1%
	Papio cynocephalus	11	12.0%
	Subtotal	12	13.0%
ETHIOPIA	*Papio anubis*	2	2.2%
	Papio hamadryas	1	1.1%
	Subtotal	3	3.3%
NAMIBIA (SOUTHWEST AFRICA)	*Papio anubis*	1	1.1%
	**Papio papio*	1	1.1%
	Papio ursinus	3	3.3%
	Papio spp.	3	3.3%
	Subtotal	8	8.7%
SOUTH AFRICA	*Cercopithecus aethiops*	10	10.9%
	Galago (= *Otolemur*) *crassicaudatus*	2	2.2%
	Papio cynocephalus	5	5.4%
	Papio ursinus	7	7.6%
	Cercopithecidae sp.	1	1.1%
	Subtotal	25	27.2%
TANZANIA	*Papio cynocephalus*	1	1.1%
ZAIRE	*Papio anubis*	1	1.1%
ZAMBIA	*Papio anubis*	1	1.1%
	Papio cynocephalus	6	6.5%
	**Papio hamadryas*	2	2.2%
	Papio ursinus	1	1.1%
	Papio spp.	2	2.2%
	Subtotal	12	13.0%
ZIMBABWE	*Cercopithecus aethiops*	2	2.2%
	Cercopithecus mitis	1	1.1%
	Galago senegalensis	1	1.1%
	Papio ursinus	22	23.9%
	Subtotal	26	28.3%
TOTAL		92	100%

*Species not indigenous to country.

Source: 3-177 Declaration of Importation Documents, filed at the Law Enforcement Division, Fish and Wildlife Service, U.S. Department of the Interior (Roeper, 1983).

APPENDIX A

PRIMATES LISTED IN THE U.S. ENDANGERED SPECIES ACT (ESA).[1]

(E = Endangered, T = Threatened). For species listed in the CITES Appendices, see Legislation chapter, Table 3.

SCIENTIFIC NAME	COMMON NAME	ESA	YEAR LISTED
LEMURIDAE (Incl. Cheirogaleidae, Lepilemuridae); all members of genera *Lemur, Phaner, Hapalemur, Lepilemur, Microcebus, Allocebus, Cheirogaleus, Varecia*	Lemurs	E	1970, 1976
INDRIIDAE			
Avahi spp. (all species)	Avahis	E	1970
Indri spp. (all species)	Indris	E	1970
Propithecus spp. (all species)	Sifakas	E	1970
DAUBENTONIIDAE			
Daubentonia madagascariensis	Aye-aye	E	1970
LORISIDAE			
Nycticebus pygmaeus	Lesser slow loris	T	1976
TARSIIDAE			
Tarsius syrichta	Philippine tarsier	T	1976
CALLIMICONIDAE			
Callimico goeldii	Goeldi's marmoset	E	1970
CALLITRICHIDAE			
Leontopithecus (=Leontideus) spp. (all species)	Golden-rumped tamarin[2]; golden-headed tamarin golden lion marmoset	E	1970
Saguinus bicolor	Pied tamarin	E	1976
Saguinus leucopus	White-footed tamarin	T	1970
Saguinus oedipus	Cotton-top marmoset[2]	E	1976
CEBIDAE			
Alouatta pigra[3]	Black howler monkey	T	1976
Alouatta villosa[3]	Howler monkey	E	1976
Ateles geoffroyi frontatus	Spider monkey	E	1970
Ateles geoffroyi panamensis	Spider monkey	E	1970
Brachyteles arachnoides	Woolly spider monkey	E	1970
Cacajao spp. (all species)	Uakaris	E	1970
Chiropotes albinasus	White-nosed saki	E	1970
Lagothrix flavicauda	Yellow-tailed woolly monkey	E	1976
Saimiri oerstedii	Red-backed squirrel monkey	E	1970
CERCOPITHECIDAE			
Cercocebus galeritus	Tana river mangabey	E	1970
Cercocebus torquatus	White-collared mangabey	E	1976
Cercopithecus diana	Diana monkey	E	1976
Cercopithecus erythrogaster	Red-bellied monkey	E	1976
Cercopithecus erythrotis	Red-eared nose-spotted monkey	E	1976
Cercopithecus lhoesti	L'hoest's monkey	E	1976
Colobus kirkii	Zanzibar red colobus	E	1970
Colobus badius rufomitratus	Tana River red colobus	E	1970, 1976
Colobus satanas	Black colobus	E	1970
Macaca arctoides	Stump-tailed macaque	T	1976
Macaca cyclopis	Formosan rock macaque	T	1976
Macaca fuscata	Japanese macaque	T	1976
Macaca silenus	Lion-tailed macaque	E	1970
Macaca sinica	Toque macaque	T	1976
Papio leucophaeus	Drill	E	1976
Papio sphinx	Mandrill	E	1976
Presbytis entellus	Entellus langur[4]	E	1976

APPENDIX A (cont.)

SCIENTIFIC NAME	COMMON NAME	ESA	YEAR LISTED
Presbytis francoisi	Francois' leaf monkey	E	1976
Presbytis geei	Golden langur	E	1976
Presbytis pileatus	Capped langur	E	1976
Presbytis potenziani	Long-tailed langur[4]	T	1976
Presbytis senex	Purple-faced langur	T	1976
Pygathrix nemaeus	Douc langur	E	1970
Rhinopithecus avunculus	Tonkin snub-nosed monkey	T	1976
Nasalis (=Simias) concolor	Pagi Island langur	E	1970
Theropithecus gelada	Gelada (baboon)	T	1976
HYLOBATIDAE			
Hylobates spp. (including *Nomascus)*	Gibbons	E	1970, 1976
Symphalangus syndactylus	Siamang	E	1976
PONGIDAE			
Gorilla gorilla	Gorilla	E	1970
Pan paniscus	Pigmy chimpanzee	T	1976
Pan troglodytes	Chimpanzee	T	1976
Pongo pygmaeus	Orangutan	E	1970

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[1] Note that species are listed here by family to facilitate comparison with the CITES Appendices. However, on the Endangered Species Act list itself, they are in alphabetical order by common English name.

[2] In a number of cases, the vernacular names used in the Endangered Species Act list are not the preferred ones. The best names for the lion tamarins are: golden lion tamarin *(Leontopithecus rosalia)*, golden-headed lion tamarin *(Leontopithecus chrysomelas)* and golden-rumped lion tamarin *(Leontopithecus chrysopygus)*. *Saguinus oedipus* is a tamarin and not a marmoset, and should be called the cotton-top tamarin.

[3] Scientific names are confused for the two *Alouatta* species. *Alouatta villosa* is actually a senior synonym for *A. pigra*, and should be used in its place. The correct name for the species referred to as *A. villosa* in this list is *A. palliata*.

[4] Again, the vernacular names used here are not the preferred ones. *Presbytis entellus* is usually called the Hanuman langur or gray langur, whereas the names for *Presbytis potenziani* are Mentawai Islands langur or joja.

Appendix B

Four data sources were used to compile U.S. primate imports for this report, and various discrepancies exist among them (Table 8). Many of the discrepancies may be a direct result of information provided on the forms. For example, Customs statistics do not include shipments with a declared value of less than $250. The U.S. imported 840 primates from Peru in 1979 (Fish and Wildlife Service - FWS - data), but none are listed in Customs statistics. According to the Interagency Primate Steering Committee (pers. comm.), Peruvian primates imported under the Pan American Health Organization were originally imported with no declared value and thus would not show up in Customs data. Customs has a separate category for animals imported for exhibit, so primates imported by zoological institutions, circuses, etc., would not be listed under the category for primate imports.

It is not necessary for government agencies importing primates to file a Center for Disease Control import form. In 1979, several shipments of primates were imported directly by government funded Regional Primate Research Centers, but these animals would not be included in CDC figures.

All importers are required to file FWS 3-177 import documents, for both commercial and non-commercial shipments. This data source probably represents the most accurate total in 1979 (Table 8). The Customs and CDC data may approach the 24,000 figure recorded by FWS if the exclusions listed above are added into those totals.

Other factors may cause discrepancies among the data sources. Customs documents include only the country of origin, whereas FWS data in Table 3 are listed by country of export. Thus, an animal originating in one country and re-exported by another to the U.S. will be listed by country of origin in Customs, and by country of re-export in FWS.

CITES data have yet to be discussed in relation to other data sources because of problems in compiling the information prior to 1980. The FWS began implementing CITES in May, 1977. At that time, port inspectors were requested to detach CITES export permits from the document packages (which include CITES permit, 3-177 import form, shipping papers, etc.) and send them to the Wildlife Permit Office (FWS) for compilation. Unfortunately, many permits were never received and those that were received were often incomplete. For instance, in Table 8 shipments of primates are listed because several permits did not list total numbers. In other cases, species names were not given.

The CITES compiling system improved in October, 1979 when the FWS requested that all document packages from the ports be sent to the Law Enforcement Division, FWS, in Washington, D.C. Here, the data is computerized. Since June, 1980, shipments of CITES species have been entered into a central computer with other information on 3-177 import forms. As a result, beginning with the 1981 U.S. CITES Annual Report, the information on primate imports for CITES data should parallel that on the FWS 3-177 forms.

APPENDIX B
U.S. PRIMATE IMPORTS FROM FOUR DATA SOURCES IN 1979

EXPORTING COUNTRY	CUSTOMS	FWS	CDC	CITES (sh = shipment)
ASIA				
Bangladesh	348	226	226	240
Indonesia	6,185	6,131	6,131	4,620
Japan	3	0	0	0
Malaysia	4,049	4,128	4,047	1,673 +56 sh
Pakistan	0	0	0	225
Philippines	4,745	4,628	4,628	200
Thailand	400	515	515	535
Subtotal	15,730	15,628	15,547	7,493
AFRICA				
Botswana	0	24	24	34
Ethiopia	757	762	762	446 +2 sh
Ghana	0	9	3	4
Kenya	1,795	1,766	1,758	1,324 +19 sh
Madagascar	2	0	0	0
Nigeria	20	20	20	65
Somalia	1,216	1,278	1,278	528 +5 sh
South Africa	72	2	0	3
Zambia	0	1	0	0
Subtotal	3,862	3,862	3,845	2,404

APPENDIX B (cont.)
U.S. PRIMATE IMPORTS FROM FOUR DATA SOURCES IN 1979

EXPORTING COUNTRY	CUSTOMS	FWS	CDC	CITES (sh = shipment)
NEOTROPICS				
Bolivia	2,063	2,471	1,736	1,448 +14 sh
Colombia	0	8	0	0
Guyana	368	417	355	278
Guatemala	0	8	8	8
Honduras	0	0	0	150
Panama	0	8	8	10
Paraguay	461	483	483	221
Peru	0	840	76	290
St. Kitts/Barbados	130	90	90	84
Venezuela	0	3	0	0
Subtotal	3,022	4,328	2,756	2,489
EUROPE AND CANADA				
Belgium	158	98	0	0
Canada	13	2	20	7
France	2	2	2	0
Netherlands	12	13	13	13
West Germany	2	91	91	2
Unknown	0	0	2	0
Subtotal	187	206	128	22
GRAND TOTAL	22,801	24,024	22,276	12,408 +96 sh

Sources: **Customs** - Customs Service Statistics, compiled by the Bureau of the Census, Department of Commerce (Table 1).

FWS - TRAFFIC (U.S.A.) analysis of 3-177 import forms, Law Enforcement Division, Fish and Wildlife Service, Department of the Interior (Table 3).

CDC - A. Eudey's analysis of Center for Disease Control Primate import forms, Public Health Service, Department of Health and Human Services (Table 6).

CITES - 1979 U.S. CITES annual report, compiled by the Wildlife Permit Office, Fish and Wildlife Service, Department of the Interior.

Use of Primates and Captive Breeding Programs Outside The United States

Julian Oliver Caldecott
and
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I. Introduction

In this chapter, we review the rate at which primates are currently used in each country except the United States, which is covered elsewhere (See Eudey & Mack, this volume). At the same time, we hope to establish each country's approximate ability to produce primates by captive breeding. In doing this, it is our intention to document the extent to which captive breeding has been able to relieve the international demand for wild-caught animals, and its potential for doing so in the near future.

Neither the long-term history of primate demand nor a detailed breakdown of the precise research uses of primates is particularly relevant here, although outstanding features will be mentioned as each country or region is reviewed in turn. These subjects have been the concern of several other publications (e.g. Hobbs, 1975; Hobbs & Bleby, 1976; LeCornu & Rowan, 1978, 1979; Held, 1982; Eudey & Mack, this volume).

Primates are used in a great variety of ways, from experimental surgery and dentistry, through basic physiological and medical studies, to the industrial preparation and evaluation of pharmaceuticals (e.g. Kalter, 1977). One of their most important uses has been in the production and neurovirulence testing (NVT) of polio vaccine (LeCornu & Rowan, 1979), and in many countries this remains the predominant national use. Vaccine production and NVT is both a short-term and fatal (or terminal) use of individuals, so an important feature that emerges below is that countries using many primates for this purpose need to replenish their stocks more rapidly than do other countries. Up to the mid-1970's, the species most frequently used in this way was the rhesus monkey (*Macaca mulatta*), but these became difficult to obtain and were largely replaced by cynomolgus or long-tailed macaques (*Macaca fascicularis*), green monkeys or vervets (*Cercopithecus aethiops*), patas monkeys (*Erythrocebus patas*) and baboons (*Papio* spp.). Most countries now save their stocks of *M. mulatta* (and other species that are not easy to obtain, such as chimpanzees *Pan troglodytes*), for use in long-term, nonterminal studies, and use the other species for vaccine production and other short-term work. The difference between uses that do or do not require the replacement of individuals in the short term must be appreciated in reading our review, since they have different implications for primate demand and supply. For example, a colony of macaques might be "used" in a study of behavior or endocrinology, but could be part of a breeding program at the same time, an obviously different case from that of other animals being "used" in experimental pathology. Unfortunately, the sources we have referred to here are not all explicit in making this distinction. In many caes, however, it is possible to indicate the main types of use, and these patterns are noted in each section.

A major impetus for the captive breeding of primates has been the increased scarcity, cost and unreliability of the supply of wild-caught individuals, and our main concern has been the reaction of primate users to these conditions, against the background of a steadily deteriorating conservation position for most species (Anon., 1979a; Cavey & Ter Haar, 1979; WHO, 1981). Although techniques for the husbandry of primates are now well advanced (e.g. Honjo *et al.*, 1978; Rothe *et al.*, 1978; Hackett, 1980; Laursen, 1980; Meier, 1981), a number of species remain very difficult to breed (e.g. *Pongo pygmaeus*, see Nadler, 1982). In any case, there remains a massive shortfall in worldwide captive supply relative to demand for most species by most countries (see below).

This shortfall is not the only reason for captive breeding, however. Animals other than primates that are used in laboratories are now normally required to be of known breeding stock and free of infections that could interfere with the results of experiments or endanger the health of researchers or other animals (described as "specific pathogen free" or "zootechnically clean"). Neither of these criteria is met by wild-caught primates, and this must affect the quality of research. Although zootechnically clean primates are expensive (e.g. 5,000 Dutch Guilders, approximately US $2,000, in the Netherlands for a clean *M. mulatta* versus 150-500 Guilders, approximately US $65-$200, for a wild-caught *M. fascicularis*, C.J. Kalden, pers. comm., 1982), the rigorous demands of laboratory research must eventually reinforce other reasons for turning from the use of wild individuals to that of captive-bred ones.

This review is based on the following sources:

a) published reports, especially those in the *Primate Report* series edited by Spiegel (1977, 1978 a&b, 1979 a&b, 1980, 1981 a&b, 1982);

b) responses to questionnaires sent to appropriate people and institutions between early 1979 and mid-1982. The quality and variety of this latter information have been described elsewhere (Kavanagh, this volume). Completed questionnaires and other correspondence (referred to below as "pers. comm." and year) are filed by country at the IUCN Wildlife Trade Monitoring Unit, 219(c) Huntingdon Road, Cambridge, U.K., where they may be consulted by arrangement.

Primates used primarily for exhibition purposes or as pets

The common or white-tufted-ear marmoset *(Callithrix jacchus)*, a species from northeastern Brazil that breeds well in captivity. The European Economic Community (EEC) now breeds sufficient numbers of this marmoset to satisfy its research needs (photo by R. A. Mittermeier).

are not considered in this review, but it should be noted that they comprise a comparatively small part of current primate usage. In this paper, tree shrews (*Tupaia glis*, Order Scandentia) are not treated as primates (Eisenberg, 1981).

Scientific and common names of the species mentioned in the text are listed in the Appendix. Countries with indigenous or introduced feral primates are marked with an asterisk (*).

II. Breeding and Use

A. The European Economic Community (E.E.C.)

Belgium. In 1977, 637 primates were used by nine institutions in Belgium (Table 1). More than two-thirds of these were *Cercopithecus aethiops*, virtually all of which went into short-term, terminal work on the production and testing of vaccine (Spiegel, 1978a). Accounting together for nearly a quarter of Belgium's primate use, *Macaca fascicularis* and *M. mulatta* were the only other species used extensively; most of the latter were used in long-term, non-terminal research.

The pattern of use for 1977 is very similar to that reported by Hobbs (1975) for 1973-1975, when an average of 70 percent of primates used each year has decreased in recent years, from about 905 in 1973-1975 to 637 in 1977. On the other hand, at least 1,002 *M. fascicularis* were imported by Belgium in 1978, an unknown proportion of which were re-exported; import of 420 *C. aethiops* in 1980 is at least consistent with the known previous national use of this species (Kavanagh, this volume). We have been unable to document more recent use of primates in Belgium, a country whose laws governing primate movements were inadequate at best (Kavanagh & Bennett, this volume).

Captive breeding in Belgium was apparently non-existent until 1978, when one company planned to use 25 female common marmosets (*Callithrix jacchus*) to establish a breeding colony (Spiegel, 1978a). Since *C. jacchus* (like other marmosets) typically produce twins (Eisenberg, 1981), and may produce two litters per year, this colony might be expected to produce about 80 offspring a year, most destined for terminal pharmacological and toxicological experimentation by the breeding company (Spiegel, 1978a).

Denmark. In 1977, 311 primates were used by six institutions in Denmark (Table 1). About 61 percent were *C. aethiops*, and almost all the remainder were *M. fascicularis*, the bulk of both species going into terminal virology or vaccine research (Spiegel, 1978a).

The same two species were used for the same purposes in 1973-1975 (Hobbs, 1975). The total number used, however, decreased substantially, from an annual average of 1,184 in 1973-1975 to 311 in 1977. In 1979, 123 primates were imported for research use, 88 of which were *C. aethiops* and 30 *M. fascicularis*, with 100-200 more *M. fascicularis* estimated to have been imported illegally (B. Sloth, pers. comm., 1980). The mean of the estimated illegal imports (150), added to the legal ones for the two main species, suggests that about 268 of these primates might have been used for vaccine production and testing in 1979.

TABLE 1
BREEDING AND USE IN THE E.C.C. (EXCLUDING GREECE, IRELAND AND LUXEMBOURG)

Country	BELGIUM	DENMARK	FRANCE	WEST GERMANY	ITALY	NETHERLANDS	UNITED KINGDOM
Year	1977 used bred	1977 used bred	1977 used bred	1977 used bred	1978 used bred	1977 used bred	1978 used bred
Declared number	637 0	311 2	5,233 176	2,372 1,013	1,212 0	1,774 264	2,885 745
No. in stock at year's end	378	215	1,454	3,452	1,141	2,119	2,551
No. of users	9	6	32	43	6	18	33
No. of breeders	0	1	11	22	0	7	24
No. of spp. used	9	4	13	22	6	10	15
No. of spp. bred	—	1	9	18	—	8	11
Source: Spiegel	1978a	1978a	1978b	1978b 1979b	1979a 1979b	1978a	1979a 1980
Realistic Estimate of the number used (see text)	637	311	5,233	2,372	1,900	1,774	9,048

This industry appears to be continuing, since about 100 *C. aethiops* were used for these purposes in 1980 (D. Lundgren, pers. comm., 1980).

Captive breeding in Denmark appears to be minimal, with one company using six female squirrel monkeys (*Saimiri sciureus*) to produce two offspring for its own use in 1977, and planning to reduce this colony in 1978 (Spiegel, 1978a). In 1981, an enterprise to produce five *C. aethiops* each year was under consideration (Balner, 1981).

France. In 1977, 5,233 primates were reported to have been used in 32 French institutions (Table 1), which would make France the largest user in the E.E.C. (Spiegel, 1978b), with the possible exception of the United Kingdom (see below). Another institution reported its use of 21 primates for the first time in 1978 (Spiegel, 1979b). As Mahouy (1977) has pointed out, however, more than 60% of laboratories in France use only 20-40 primates each year, and many of these small-scale users may have been missed by Spiegel's survey.

The three types of primates most heavily used in 1977 were *M. fascicularis* (40.2%), *E. patas* (29.2%) and *Papio* spp. (10.3%). Virtually all of the first two species went into vaccine production and testing, while the baboons were used in a variety of ways (Spiegel, 1978b, 1979b). The next three most used species, *C. aethiops*, *M. mulatta*, and *S. sciureus*, accounted for 18.3% of use, the first going mostly into terminal virology, the last into terminal toxicology, and *M. mulatta* to a variety of uses, although nearly three-quarters of all rhesus monkeys were used in short-term, terminal work (Spiegel, 1978b). These six taxa together contribute 98% of all primates used in 1977. The high proportion of primates used terminally in France (78.3%) suggests that imports should be similarly high; Kavanagh (this volume) assesses the country's possible annual import at about 4,000 animals in recent years, and 78.3% of the annual usage of 5,233 is indeed about 4,000.

As with Belgium and Denmark, the patterns of use in 1977 are consistent with those for 1973-1975 (Hobbs, 1975). The total number used in France has declined slightly to 5,233 in 1977 from 5,922 in 1975, but had previously increased to these levels from only 2,692 in 1973 and 3,046 in 1974.

Eleven institutions were breeding primates for research use in 1977, though no industrial users appeared to be involved (Spiegel, 1978b). A total of 176 primates was produced, almost all of which were *C. jacchus*, *M. fascicularis* or *Papio* spp., with the trend predicted for 1978 being increased numbers of the first two species and stable numbers of baboons. By 1980-1982, however, at least six large breeding centers were to be in operation (Spiegel, 1981b), with a combined output of 170 primates in 1981. Almost all of these were *C. jacchus* or *M. fascicularis*, again with a predicted upward trend for these species in 1982. A new breeding center at the University of Lyons, mentioned in Mahouy (1977), is not included in these figures, possibly because it has not yet come into full production. Again it is noteworthy that industrial users appear not to be involved in breeding.

Other sources of domestic primate production in France include various open zoos or safari parks (Mahouy, 1977), two of which now breed significant numbers (approximately 200 each year) of *Macaca sylvanus* (see Merz & De Turckheim, undated; G. De Turckheim and W. Angst, pers. comm., 1982). There is reluctance to allow these surplus macaques to be used for invasive research, however, and reintroductions to the wild have been attempted (Merz, 1982; but see Caldecott & Kavanagh, 1983).

West Germany. In 1977, 2,372 primates were used at 43 institutions in West Germany, making it the third largest user in the E.E.C. (Table 1). The three most heavily used species were *M. mulatta*, *M. fascicularis*, and *C. aethiops*, accounting for 61% of use together. The rhesus macaques were used in a variety of ways, with the three largest users doing research on toxicology; both the long-tailed macaques and the green monkeys were used in terminal virology and vaccine production (Spiegel, 1978b). Other species, of which more than 100 (4.2%) individuals were used in 1977, were common marmosets, stump-tailed macaques (*Macaca arctoides*), baboons, cotton-top tamarins (*Saguinus oedipus*) and squirrel monkeys, about half of which were used terminally, though none in the vaccine industry. The low usage of primates for vaccines in West Germany relative to Belgium, Denmark and France is consistent with Hobbs' (1975) findings for 1973-1975. Reflecting this difference, only 36.1% of primates used in West Germany in 1977 went into short-term terminal work (such as vaccine production and NVT), compared with 78.3% in the same year in France. This is probably responsible for the fact that by the end of 1977, the number of primates in stock in West Germany was 1,080 more than had been used in that year, whereas in France it was 3,779 less (Table 1). The total number of primates used in West Germany has decreased from an average of 3,730 each year in 1973-1975 (Hobbs, 1975) to 2,372 in 1977; just over 2,000 were imported during 1979 (Kavanagh, this volume).

In 1977, West Germany had the highest ratio of primates bred to primates used in the E.E.C. (Table 1), having produced 1,013 of them in 22 institutions (Spiegel, 1978b). Both *M. fascicularis* and *M. mulatta* were produced in significant numbers (371 & 307 respectively), as were *C. jacchus* (191). These three species contributed 85.5% of the total number bred. In 1980-1982, twelve of the larger breeding centers in West Germany were reviewed by Spiegel (1981), including the Deutsches Primatenzentrum which was founded in 1977 (Spiegel, 1978a; Kuhn, 1979). These centers together produced 652 primates in 1981, the three most important species again being *C. jacchus*, *M. mulatta* and *M. fascicularis* (79.9%); saddleback tamarins (*Saguinus fuscicollis*) also contributed 8.4%. The Deutsches Primatenzentrum produced four offspring of *Papio hamadryas* and *Saguinus oedipus* in 1981. It should be noted that this primate center is still under construction and should be completed in 1983 or 1984, at a cost of more than 40 million Deutschmarks.

Greece. Between 1974 and 1982, Greece imported an annual average of 110 primates from several European, African and Asian countries (A. Klossas, pers. comm., 1982). In 1978, 70 macaques came from Indonesia and Malaysia, and in 1979, 100 from Malaysia (Kavanagh, this volume). This probably indicates at least some use in the country, and contradicts the statement by Antikatzides (1979) that only rhesus monkeys are imported in small numbers as pets.

Ireland. In 1978, three *M. fascicularis* were used in terminal studies on alcoholism at one institution in the Irish Republic (Table 1; Speigel, 1979a). No breeding is reported. Very small numbers (less than five each) of squirrel monkeys, long-tailed macaques and pig-tailed macaques (*Macaca nemestrina*) were imported during 1980 and 1981 (Kavanagh, this volume).

Italy. In 1978, between 1,041 and about 1,358 primates were used at six institutions in Italy, according to Spiegel (1979a&b). The source of this uncertainty is one institution's provision of only the number of animals in stock, without figures for use. These primates were reportedly involved in toxicology research. Since most toxicology studies listed in *Primate Report* appear to be either terminal or to use at least half of stock primates each year, we have taken a median figure for total use in Italy for 1978 of 1,212. However, even the higher figure (1,358) might be too low, because according to estimates by Chiarelli & Ardito (1979), Italy's annual use of primates is between 1,500 and 1,800. In 1980, at least 1,900 primates were imported, being mostly *S. sciureus* (36.8%), *M. fascicularis* (25.4%) and *C. aethiops* (25.2%). In any case, it appears that total usage has not decreased from the levels reported by Hobbs (1975) of an average of 1,142 each year in 1973-1975, and may have, in fact, increased substantially.

The three most heavily used species, *M. fascicularis*, *M. mulatta*, and *C. aethiops*, together accounted for 97.4% of use, and almost all were employed in toxicology or vaccine production and NVT. The latter forms of use accounted for 100% of primate use in Italy in 1973-1975 (Hobbs, 1975), so there has been only limited diversification since then.

No captive-breeding was reported for 1978. However, by 1979, plans existed for the development of a major center to breed 1,500-2,000 individuals of the three most important species, which would achieve self-sufficiency for Italy (Chiarelli & Ardito, 1979). In 1981, some 200 female *C. jacchus*, and 100 *Papio* spp. and 60 Japanese macaques (*Macaca fuscata*) of unspecified sex, were in productive breeding colonies; 30 *M. fascicularis* were soon to be added (G. Ardito & P. Messeri, pers. comm., 1982).

The Netherlands. In 1977, 1,774 primates were used in 18 institutions in the Netherlands, making it the fourth largest user in the E.E.C. (Table 1; Spiegel, 1978a). This overall level appears not to have changed significantly from that in 1973-1975 since the average number used for those years was 1,802 each year (Hobbs, 1975). Although the average number imported each year between 1977 and 1981 was 4,125 (C.J. Kalden, pers. comm., 1982), a majority were re-exported to the Soviet Union, Sweden, France and Belgium (see Kavanagh, this volume). Therefore it is difficult to relate imports directly to usage.

M. mulatta and *M. fascicularis* together accounted for 85.1% of use in 1977. The slightly more favored *M. mulatta* was used in a variety of ways, mostly non-terminal, and the less used *M. fascicularis* went almost entirely into vaccine production and NVT. Of the three next most used species, accounting collectively for 13.1% of use, *Pan troglodytes* and *M. arctoides* were mostly employed in non-terminal behavioral and immunological studies, while *Callithrix jacchus* was used in a variety of ways. The relatively light use of primates overall for vaccine production and testing in the Netherlands is consistent with Hobbs' (1975) findings for 1973-1975. About half of the primates used went into short-term terminal work (versus more than three-quarters in France), and as a consequence, more primates were in stock at the end of 1977 than were used during the year. By 1981, tissue cultures had replaced the use of live primates for most polio vaccine work, at least at one major institute (C.J. Kalden, pers. comm., 1982).

Captive breeding in 1977 produced 264 primates of eight species; nearly half were *M. mulatta* with seven institutions being involved (Spiegel, 1978a). By 1982, the number of species bred had decreased to six, but the number of offspring produced each year increased to 387 in 1981 (C. Goosen, pers. comm., 1980; C.J. Kalden, pers. comm., 1982), again in seven main institutions. The most successfully bred species were *M. mulatta* (34.4%), *M. fascicularis* (30.0%), and *C. jacchus* (28.4%). From the point of view of species preservation, though, the Rijswijk Primate Center's production of about 10 *Pan troglodytes* per year may be the most significant.

United Kingdom. In 1978, 2,885 primates were declared to have been used in 33 institutions in the U.K. (Spiegel, 1979a, 1980), making it the second largest national user in the E.E.C. after France, according to the data listed in Table 1. These figures are incomplete, however. The U.K. Ministry of Agriculture, Fisheries and Food (MAFF) reported the import of 10,474 primates to quarantine in 1978 (MAFF official figures, 1982), while Shamrock Farms alone imported 4,182 and exported 1,426 to various countries in the same year (J. Bradshaw and R.E. Hackett, pers. comms., 1982). The difference between known importation and minimum exportation in 1978 is therefore 9,048; this is similar to the average annual import of 9,232 between 1975 and 1978 calculated from MAFF figures, and this in turn is similar to the average import of 9,372 each year between 1973 and 1975 given by Hobbs (1975) and Hobbs & Bleby (1976). In 1980, the U.K. Department of the Environment (DoE) reported the import of 8,983 primates, about 5,000 of which are accounted for by two known importers (Kavanagh, this volume); the DoE recorded 1,947 exports in the same year (difference 7,036). In 1981, the DoE claimed imports of 1,890 and exports of 2,499; meanwhile, the two known importers brought in more than 5,000 (Kavanagh, this volume). Although it is difficult to make sense of the latter figures, the overall pattern seems to show that 8,000-9,000 primates were replaced annually from 1973 to 1978. This decreased to about 7,000 in 1980, and to an indeterminate but probably slightly lower figure in 1981. In 1968-1971 average annual imports were 11,990 (Hobbs, 1975; Hobbs & Bleby, 1976), so there has been an overall downward trend in usage since then. This decrease appears to be a consequence of a large reduction in the demand for primates used in the production of polio and other vaccines, and a lesser but still substantial fall in their use in vaccine NVT (K.R. Hobbs, pers. comm., 1982). Whereas nearly half of the primates used in the U.K. in 1968-1971 were for vaccines (Hobbs & Bleby, 1976), none was reportedly used for vaccines in 1978 (Spiegel, 1979a, 1980). On the other hand, some laboratories do not report their usage for commercial reasons (e.g. Imperial Chemical Industries (ICI); G. Holman, pers. comm., 1982). This probably accounts for the discrepancies in vaccine usage and overall totals.

The most heavily used species in 1978 were *M. mulatta* (41.7%), *M. fascicularis* (19.7%), *Papio* spp. (18.3%) and *C. jacchus* (11.9%); these four taxa together contributed 91.6% of usage (Spiegel, 1979a, 1980). The predominance of the first three was well established in 1968-1971 (Hobbs & Bleby, 1976) when they and *S. sciureus* accounted for 85% of used primates; in 1978, *S. sciureus* use was down to only 1.9%.

Captive breeding in 1978 produced 745 primates at 24 institutions; 80.5% of these were *C. jacchus* and 12.9% *M. mulatta*. The high production rate of *C. jacchus*, which was predicted by breeders to increase in 1979 (Spiegel, 1979a), is no doubt responsible for its increased popularity as a research animal.

In 1981, eleven large breeding units in the U.K. produced a total of 853 primates (Spiegel, 1981b), of which 85.2% were *C. jacchus*, 8.0% *M. fascicularis* and 4.6% *M. mulatta*. At least one other breeding unit (ICI) is excluded from these figures, however; in 1978 it alone produced about 500 *C. jacchus* (Balner, 1981), and this colony continues to date (G. Holman, pers. comm., 1982). The trend predicted for the three major species was upward, and the U.K. is probably by now self-sufficient at least in *C. jacchus*. In passing, it should be noted that the breeding colony of 800-1,000 *M. fascicularis* reported for Intersimian Ltd. by Spiegel (1981b) is about to be established in the Philippines, and should not have been included in U.K. figures (K.R. Hobbs, pers. comm.). For a detailed discussion of British imports, see Kavanagh (1983a).

The European Economic Community: Overview.

Table 2 lists all primate species declared in *Primate Report* to have been used or bred in captivity (outside of display collections) in the E.E.C. in 1977 or 1978 (depending on country). In compiling these figures, we have assumed an approximate parity of use between the years 1977 and 1978 in order to include all the countries. In addition, many of the figures in the source material were given as estimates or ranges, and the exhaustiveness of the original survey may not have been complete (e.g., see Italy and the U.K. above). Therefore, we doubt that any particular number in Table 2 is precisely accurate, and we regard the total as a large but incomplete sample of overall use. We do believe, however, that the main patterns of use have been identified, and that the overall level of use by E.E.C. totalled approximately 15,000-20,000 primates each year in the late 1970's. A great majority of these animals were used terminally.

TABLE 2

BREEDING AND USE IN THE E.E.C. (BY SPECIES), PER YEAR 1977-1978 EXCLUDING GREECE, IRELAND AND LUXEMBOURG).

Species	Used	Bred
Aotus trivirgatus[1]	61	7
Ateles paniscus	0	1
Callicebus moloch	38	9
Callimico goeldii	8	0
Callithrix argentata	8	1
Callithrix jacchus	664	900
Callithrix penicillata	0	5
Cebus apella	33	3
Cercocebus albigena	0	3
Cercocebus galeritus	0	1
Cercocebus torquatus	10	0
Cercopithecus aethiops	1,692	30
Cercopithecus diana	1	0
Cercopithecus neglectus	0	1
Cercopithecus petaurista	2	0
Cercopithecus spp.	7	0
Erythrocebus patas	1,584	0
Galago crassicaudatus	11	1
Galago demidovii	54	20
Galago senegalensis	3	3
Hylobates spp.	14	0
Lemur catta	6	0
Lemur fulvus	2	0
Macaca arctoides	269	31
Macaca fascicularis	4,269	481
Macaca mulatta	3,467	533
Macaca nemestrina	32	0
Macaca tonkeana	8	0
Miopithecus talapoin	0	1
Nycticebus coucang	5	0
Pan troglodytes	139	15
Papio spp.	1,212	62
Perodicticus potto	2	0
Saguinus fuscicollis	17	11
Saguinus labiatus	2	12
Saguinus oedipus	108	30
Saimiri sciureus	462	39
Total	14,190	2,200
Ratio	6.5	1

[1] The genus *Aotus* has recently been divided into 9 separate species (Hershkovitz, 1983)

Note: Slight discrepancies between Tables 1 and 2 result from estimates and ranges in source material.

Source: Spiegel, 1978a, 1978b, 1979a, 1979b, 1980.

It appears that the use of primates within the E.E.C. has decreased since 1973-1975, when it averaged about 22,000 each year (Hobbs, 1975). This is in keeping with the general worldwide decline in the volume of the primate trade over the same period (Kavanagh, this volume; Mack & Eudey, this volume). What fueled this decline has been a combination of lack of availability and the increasing cost of wild-caught primates, and the increased efficiency of use brought about by technical advances among the research and industrial user communities (LeCornu & Rowan, 1978). Such technical improvements are largely responsible for the decline in the use of primates for vaccine production and NVT in the U.K., for example.

Four species alone contributed 77.6% or 11,012 of all primates declared to be used in the E.E.C. in 1977-1978: *Macaca fascicularis* (30.1%), *M. mulatta* (24.4%), *Cercopithecus aethiops* (11.9%) and *Erythrocebus patas* (11.2%). This total increases to 86.1% with the addition of the genus *Papio* (8.5%), and to 90.8% with that of *Callithrix jacchus* (4.7%). The top ten ranking taxa used together account for 97.8% of use in 1977-1978 (Table 3). The overwhelmingly important usage of the four top species was for vaccine preparation and testing, just as it had been in previous years (Hobbs, 1975; LeCornu & Rowan, 1978). By 1977-1978, however, there were strong signs that *M. mulatta* was tending to be used less for short-term terminal work such as that of vaccine production and NVT in the major user countries (other than in Italy and France). This no doubt resulted from the rapidly tightening export quotas and the export ban imposed by India, the major source of wild-caught rhesus monkeys (Kavanagh, this volume). Meanwhile, *M. fascicularis* and *C. aethiops* especially were increasingly being used in place of rhesus monkeys, except in France; France has historically met its needs for vaccine work with *M. fascicularis* and *E. patas* (Hobbs, 1975) and appears still to do so.

Comparing 1977-1978 figures with Hobbs' (1975) data for 1973-1975, and taking into consideration more recent information available to us, the trends in overall primate use in each country are as follows:

a) Belgium - declining;
b) Denmark - declining;
c) France - stable;
d) West Germany - declining;
e) Greece - stable (almost zero use);
f) Ireland - stable (almost zero use);
g) Italy - increasing;
h) Netherlands - stable; and
i) United Kingdom - declining or stable.

In considering the captive breeding of primates needed to satisfy the continuing demand for primates within the E.E.C., it is clear from Table 2 that a considerable shortfall of captive-bred supply existed in 1977-1978. Overall, the ratio between used and bred primates was about 6.5:1. Furthermore, there was no significant correlation between the numbers used of each species and those bred (Table 3; $r_s = 0.546$, $N = 10$, $p < .05$), although this might be expected to change as users take advantage of available captive-bred specimens in planning their research or other use. Although captive-bred animals will be of higher quality for research than wild-caught ones, their much higher cost could continue to outweigh their value as standardized and pathogen-free specimens. Most usage of primates does not require animals of very high quality (Hiddleston & Smith, 1982). Consequently, many users, particularly the large industrial ones, might continue to buy cheaper, wild-caught monkeys (especially *M. fascicularis*, *C. aethiops* and *E. patas*) if they remain available in large numbers. If captive-bred supplies of species less easy to obtain from the wild (e.g., *M. mulatta* and *C. jacchus*) are adequate for specialized research needs, user access to wild-caught individuals of other species is bound to inhibit the further development of captive-breeding programs.

TABLE 3

THE TEN MOST USED SPECIES IN THE E.E.C. — BREEDING AND USE

	Percent		Rank	
Species	Used	Bred	Used	Bred
Macaca fascicularis	30.1	21.9	1	2
Macaca mulatta	24.4	3.8	2	3
Cercopithecus aethiops	11.9	1.4	3	7=
Erythrocebus patas	11.2	0	4	10
Papio spp.	8.5	2.8	5	4
Callithrix jacchus	4.7	40.9	6	1
Saimiri sciureus	3.3	1.8	7	5
Macaca arctoides	1.9	1.4	8	7=
Pan troglodytes	1.0	0.7	9	9
Saguinus oedipus	0.8	1.4	10	7=

More information is available from which to assess the trends in captive breeding since 1978 than was the case for levels of use. From this the following summary can be made:

a) Belgium - minimal breeding, minimal increase;
b) Denmark - no significant breeding;
c) France - little but increasing breeding for research, no breeding for industry;
d) West Germany - considerable and increasing breeding;
e) Greece - no significant breeding;
f) Ireland - no significant breeding;
g) Italy - little breeding, but levels may be about to increase;
h) Netherlands - moderate breeding level and increasing.
i) United Kingdom - moderate breeding level and increasing.

A feature of the major breeding countries (France, West Germany, the Netherlands and the U.K.) is that their breeding efforts are becoming increasingly specialized to produce *M. fascicularis*, *M. mulatta* and *C. jacchus*, with breeding of *Papio* species also prominent in France. It was a major conclusion of Hobbs' (1975) report that just these four taxa potentially could satisfy almost all the E.E.C.'s primate requirements, and should therefore be bred intensively. As noted above, however, there is still only minimal breeding of the commonly used *C. aethiops* and *E. patas*, since both are still freely available from the wild. In any case, there is manifestly a long way to go before the E.E.C could hope to be self-sufficient in primates other than *C. jacchus* and possibly *M. mulatta*, which are no longer available from the wild.

B. Other European Countries

Finland. In 1978, five *Macaca arctoides* were used at the University of Helsinki (Spiegel, 1979a). Low-level use of the same species continued in 1980 (D. Lundgren, pers. comm., 1980).

Captive breeding produced one *M. arctoides* in 1978, with an upward trend predicted for 1979 (Hyvarinen & Linnankoski, 1979; Spiegel 1979a). Recently, there have been reports that a major breeding establishment is planned, for which external funds are being sought (Animark Oy in M. Nordin, pers. comm., 1982).

Spain. In 1979, ten primates were used at the Centro Ramon y Cajal in Madrid (Spiegel, 1980). These were all rhesus and Barbary macaques (*M. mulatta* and *M. sylvanus*), with some long-tailed macaques (*M. fascicularis*) being held in stock. No breeding is reported.

Sweden. In 1978, 1,586 primates were used at three institutions in Sweden (Spiegel, 1979a), a level of use comparable with that of the major E.E.C. users. Most of these (93.4%) were *M. fascicularis*, all of which were used terminally in a variety of biomedical fields including vaccine production and NVT. The second most used species, *C. aethiops* (4.7%), was employed for the same purposes.

In the 1978-1979 fiscal year, about 1,750 primates were imported by Sweden, 94% of which were *M. fascicularis* and 3.4% *C. aethiops*. About 1,300 went into polio vaccine production and NVT (D. Ludren, pers. comm., 1980). Imports during the whole of 1979 were 3,227, suggesting a continuing high requirement for wild-caught animals (Kavanagh, this volume). Almost all importation and use was by the National Bacteriological Laboratory (SBL).

Captive breeding in Sweden produced 43 *M. fascicularis* at the SBL in 1978. More recently, plans have been developed for an expanded breeding facility there (D. Lundren, pers. comm., 1980). SBL projected a decline of primate use for polio vaccine to about 500 animals each year or less, meaning that Sweden would approach self-sufficiency but would still require importation of about 200 *M. fascicularis* and about 100 *C. aethiops* each year. Funding for this project was still being sought in 1980, so production would not be expected on a significant scale before the late 1980's (see the Deutsches Primatenzentrum under West Germany above).

Switzerland. In 1980, 616 primates were used in nine institutions in Switzerland (Spiegel, 1981a). The majority were *M. mulatta* (32.3%) or *Saimiri sciureus* (33.4%). The uses to which these animals were put varied, but only 9.7% were terminal (see France and West Germany above), with 3.4% being used for vaccines. This pattern is consistent with Hobbs' (1975) finding that only about 5% of primates used in Switzerland went into vaccine-related work in 1973-1975 (in comparison to an E.E.C. average of about 71%). The overall level of use appears to have increased somewhat since 1973-1975, when an average of 290 primates were used each year (Hobbs, 1975). Almost all of the 1980 imports were *C. jacchus* (30.3%), *M. mulatta* (29.8%) or *S. sciureus* (27.5%) (Kavanagh, this volume).

Captive breeding in Switzerland produced 122 primates in 1980, most of which were *S. sciureus* (48.4%) or *C. jacchus* (31.1%), with seven institutions being involved (Spiegel, 1981a). As might be expected, the largest breeders were the big pharmaceutical companies Hoffmann-La Roche, Sandoz and Ciba-Geigy. The latter has recently put a new primate center into operation at Basle (Jaeckle & Bruhin, 1981), which produced 132 *C. jacchus* in 1981 and is planning to expand (Spiegel, 1981b). Currently, at least four major centers are breeding significant numbers of primates (D. Glaser, pers. comm., 1982), concentrating on *C. jacchus*, *S. sciureus* and *M. mulatta*.

Union of Soviet Socialist Republics (U.S.S.R.). The use of primates in the U.S.S.R. dates back to the 1920's, when the Institute of Experimental Pathology & Therapy of the Academy of Medical Sciences of the U.S.S.R. was established at Sukhumi (Asanov, 1972). As of 1972, eight generations of *Papio hamadryas* and six of *M. mulatta* had been captive-bred at Sukhumi (Asanov, 1972), and the same report indicated substantial breeding of *C. aethiops*. By 1977, a further generation of *P. hamadryas* had been obtained, and a major program of expansion was underway (Gay & Held, in Anon., 1979b). The same report indicated a Soviet commitment to the efficient use of animals, both in experimental design and by re-using individuals as breeding stock. The suggestion that the country may be nearly self-sufficient in captive-bred primates, however, is contradicted by the thousands of *P. hamadryas*, *C. aethiops* and *M. fascicularis* imported in 1980-1981 (Kavanagh, this volume). The use of these animals is unknown.

In 1979, a new facility was established at Moscow for the study of virology, using moustached tamarins (*Saguinus mystax*) as a model (Balayan & Lebedeva, 1981). As of 1980-1981, 52 *S. mystax* were in stable pairs and presumably about to breed, although this species is notoriously difficult to propagate in captivity (J.M. Ayres, pers. comm., 1982).

Other European Countries: Overview.

Captive breeding and use of primates in Europe outside the E.E.C. may be summarized as follows:

a) Finland - minimal use, minimal breeding, projected expansion of breeding program;
b) Spain - minimal use, no breeding;
c) Sweden - substantial but declining use, some breeding, projected expansion of breeding program;
d) Switzerland - moderate and steady or increasing use, substantial and increasing breeding;
e) U.S.S.R. - substantial use, substantial breeding, expansion of breeding program.

C. Asia

China*. Although trapping for export of *M. mulatta* in the 1950's was known to have contributed to the decline in wild Chinese primate populations (Zhang *et al.*, 1981), few other details of trade or use in China have been available. In 1982, however, the following figures were obtained (Kunlong Ben, pers. comm., 1982): annual usage of *M. mulatta* averages about 1,000 individuals, several hundred of which are used in polio vaccine production and NVT at the Kunming Institute of Medical Biology, which also uses some *M. arctoides* for the same purposes. Most of both species are wild caught. Future research needs have generated an interest in importing some chimpanzees, baboons, green monkeys, capuchins (*Cebus* spp.) and marmosets; some capuchins and baboons have already been imported. Current research demands, however, are apparently mostly met by indigenous species, either wild-caught or captive-bred.

Annual breeding seems to amount to about 700 individuals, mostly *M. mulatta* but also including *M. nemestrina*, *M. arctoides*, *M. assamensis* and *Nycticebus coucang*, the slow loris. At least five institutions are involved: the Guangdong Institute of Entomology, the Shanghai Institute of Physiology, the Shanghai Laboratory Animal Center, and the Kunming Institutes of Medical Biology and Zoology. Most bred animals are for local use, but a number are exported (for example, 117 went to Japan in 1981 - Kavanagh, this volume; see also Kavanagh & Bennett, this volume), and this export is expected to grow. All of the breeding institutions plan to increase their production in the future. A National Primates Research Center is being established and will be affiliated to the Kunming Institute of Zoology.

India*. In 1979, 1,417 primates were used at seven institutions in India, a level of use similar to that of Sweden, Italy and the Netherlands (Spiegel, 1980). Almost all those used were indigenous species: rhesus monkeys (50.5%), bonnet macaques (*Macaca radiata*) (37.8%) and gray langurs (*Presbytus entellus*) (11.9%). About a third of the rhesus monkeys were used terminally, but most of the remainder were reported to be involved in the "non-terminal" control testing of polio vaccine (the only time in a *Primate Report* that this use is not described as fatal). Most of the bonnet macaques were reported to be used in non-terminal research work, whereas most of the langurs were used terminally in a variety of studies.

Captive breeding in 1979 produced 45 primates, more than half of which were *M. radiata* and the remainder *C. jacchus* and *P. entellus* (Spiegel, 1980). A rapid expansion of the *M. radiata* breeding program was predicted for 1980. The trend for breeding *C. jacchus* was upward and for *P. entellus* was downward. Three institutions were involved in 1979-1980.

Indonesia*. Indonesia is a major exporter of *M. fascicularis* (see Kavanagh, this volume), but insignificant numbers have been bred there in the past. There are now breeding and rearing facilities in West Java (at Cenkareng and Serpong), which are expected to produce several hundred *M. fascicularis* each year (C.L. Darsono, 1979 and pers. comm., 1981; Oendang Badroezzaman, letter to the Minister of State for the Supervision of Development and the Environment, July 17, 1979; Wartono Kadri, pers. comm., 1982).

Israel. In 1980, 95 primates were declared to have been used at seven institutions in Israel, most of which were *C. aethiops* (42.1%) and *S. sciureus* (32.6%) (Spiegel, 1982). The reported use of *C. aethiops* is consistent with reported export of 30 of this species to Israel from Kenya in 1979 (Kavanagh, this volume), although there is a discrepancy in the total numbers declared to be involved: 300 primates were exported to Israel in 1979 versus 80 used or in stock in Israel in 1980.

In 1980, two *S. sciureus* were bred at two institutions, and increased numbers were predicted for 1981 (Spiegel, 1982).

Japan*. Importation of primates into Japan has been documented by country of origin since 1970 (see Kavanagh, this volume). Japan averaged about 7,000 primate imports from Indonesia and Malaysia combined in the 1970's, followed by a sharp decrease to 5,349 and 4,691 in 1980 and 1981, respectively. About one third of the total imports were to supply biomedical needs, but the usage of the remainder is unknown (Y. Kawanishi, pers. comm., 1979). Honjo & Nomura (1972) rank the composition of 2,548 primates imported to 23 major institutions (at a time when total imports to Japan peaked at over 20,000 each year) in the order of *M. fascicularis, M. mulatta, E. patas* and *M. fuscata*. The latter species presumably represented internal trade, since an average of at least 547 *M. fuscata* were captured each year in Japan from 1968 to 1974 (Y. Sugiyama, pers. comm., 1980). Much unrecorded and indiscriminate trapping occurs (T. Milliken, pers. comm., 1982).

Captive-breeding in Japan was initiated at the beginning of the 1970's, with production of 25 *M. fuscata* at Nojima Island in 1971 (Nomura *et al.*, 1972), which was regarded as a pilot enterprise. There are numerous provisioned and very productive free-ranging groups of *M. fuscata* in Japan (e.g., see Itani, 1975). By 1979, large-scale breeding of *M. fascicularis* in the fourth generation was occuring at the Tsukuba Primate Center, with a target of 400-500 produced each year (Honjo *et al.*, 1978; S. Honjo, 1978 & pers. comm., 1979). Japan is the only habitat country that is breeding non-indigenous primates on a large scale.

Malaysia*. Between 1970 and 1979, a total of 1,240 indigenous primates was used by the Institute of Medical Research in Malaysia, 63.7% of which were *M. fascicularis* and the remainder silvered langurs (*Presbytis cristata*) (Nordin & Hasnah Samian, 1981). Average annual usage in this period was 124, but in 1980 usage had decreased to 30 *M. fascicularis*.

In 1982, only one commercial company, Research Primates Malaysia, was attempting to breed *M. fascicularis* systematically for export (Nordin & Hasnah Samian, 1981; Dept. of Wildlife & National Parks, pers. comm., 1982), with a target production for 1986 of about 1,000 each year. Recently, however, the Malaysian government has announced plans to ban the commercial export of all primates during 1984 (Anon., 1983). A previous breeding attempt by the Institute of Medical Research (Werner *et al.*, 1980) was a pilot study. The National University has been using a very small number of macaques and gibbons (*Hylobates* spp.) for physiological research since the mid-1970's, and there are plans to expand this operation with breeding groups of several indigenous species (Kavanagh, 1981). Over the period 1978 to 1981, the Agricultural University established a small primate research unit with four lar gibbons (*H. lar*) and breeding groups of long-tailed macaques and banded langurs (*Presbytis melalophos*) (Kavanagh, 1978; Sewellengam & Kavanagh, 1981; Vidyadaran, 1981).

The Philippines*. Although there is some domestic research on *M. fascicularis* (Zomera, undated), the Philippines is important as a major exporter of this species (Kavanagh, this volume). At least one local company conditions wild-caught individuals for export; it has a holding capacity of 900 and intends to expand its research usage (Anon., 1982a). Another joint United Kingdom and local enterprise was planning to establish a large conditioning and breeding center in 1982-1983 (K.R. Hobbs, pers. comm., 1982).

Taiwan*. In 1970, 450 endemic Taiwan macaques (*M. cyclopis*) and 100 unspecified New World monkeys were used by medical schools, hospitals and biomedical research laboratories in Taiwan; at this time, at least 36 institutions were using mammals for research and industrial and teaching purposes (Chiang & New, 1973). Although *M. cyclopis* was being used in various studies in the early 1970's (e.g. Peng *et al.*, 1973; Taylor *et al.*, 1973), Taiwan has since become a major importer of *M. fascicularis*, taking at least 6,557 individuals in 1978 (Kavanagh, this volume). Details of usage are not available, and there are no reports of organized breeding programs.

Vietnam*. Exact numbers are not available, but some macaques are used for biomedical purposes by a pharmacological company and the Epidemiological and Hygiene Institute in Hanoi. Langurs (*Presbytis* spp.) and gibbons (*Hylobates* spp.) are also sometimes used (Dao Van Tien, pers. comm., 1982).

The Epidemiological and Hygiene Institute maintains a rhesus monkey breeding facility, with about 1,000 animals, on an island in Along Bay. These monkeys are used locally for vaccine production (Dao Van Tien, pers. comm., 1982).

Asia: Overview.

During the 1970's, various Asian countries have been either major importers or exporters of primates. Japan and Taiwan in particular were, and still are, large-scale consumers (each taking up to 5,000-6,000 annually), while Indonesia and the Philippines were, and still are, major providers (each exporting up to 7,000-10,000 annually). Patterns have changed in response to political and economic developments. For example, India ceased to export *M. mulatta*, which stimulated trade in *M. fascicularis* from other countries, and has become a substantial user itself. China, meanwhile, is rapidly increasing its domestic breeding and usage of *M. mulatta*, seemingly in conjunction with a program to increase exports of captive-bred rhesus monkeys.

Captive breeding in Asia is well-established in Japan and China, and could increase rapidly over the 1980's in India, Indonesia, Japan, and the Philippines. Except in China, where available data indicate that at least half of the most-used species (*M. mulatta*) are captive bred, the use of primates in Asia seems to be still very largely dependent upon the capture of wild specimens.

D. Australasia

Australia. In 1975-1979, an average of 261 primates was imported to Australia each year; 94.9% of them were destined for research (N.C. Gare, pers. comm., 1982; J.D. Ovington, pers. comm., 1980). Between September, 1980 and March, 1982, 236 primates of two species were imported for research use: *M. fascicularis* (84.7%) and *Papio hamadryas* (15.3%).

No breeding programs are reported.

E. Africa

Algeria*. It is reported that some use of indigenous *M. sylvanus* occurs at the Pasteur Institute (B. Asselah & H. Meziane, pers. comm., 1982), and that captive breeding of this species might begin soon.

Gabon*. Breeding of indigenous *Pan troglodytes* in small numbers was reportedly attempted at the Primatology and Ecology Center at Makokou, an institution supported by the French CNRS (Mahouy, 1977). Some breeding and research occurs at the International Center for Medical Research at Franceville (CIRMF), but there is little other activity elsewhere in the country (A. Gautier, pers. comm., 1980; R.W. Cooper & R. Dopouma, pers. comms., 1982). There is, however, a research colony of Gabonaise primates (including eight species) that has been established in France (Gautier, 1982).

Kenya*. The Institute of Primate Research was founded in 1958 at Tigoni and expanded in 1978 to accommodate 300 individuals of Kenyan green monkeys (*C. aethiops*), mangabeys (*Cercocebus* spp.), Colobus monkeys, (*Colobus* spp.), thick-tailed galagos (*Galago crassicaudatus*) and baboons (*Papio* spp.). (Else, 1978). As of 1981, 529 individuals of nine species were at the institute, of which most were *Papio anubis* (38.4%), *C. aethiops* (33.1%) or blue monkeys, *Cercopithecus mitis* (17.0%); 142 of the total stock had been captive-bred (IPR Annual Report, 1981). The institute was moved to larger facilities at Ololua in 1982. Little other activity is reported elsewhere in the country (C.E. Norris, pers. comm., 1981; J.G. Else, pers. comm., 1982).

Madagascar*. A small captive breeding station for endemic lemurs was operative in 1979 (A. Jolly, pers. comm., 1979). The colony contained less than fifty animals, mostly *L. catta* and *L. fulvus* sspp. (including a number of hybrids) (R.A. Mittermeier, pers. comm., 1984).

Mauritius*. Introduced *M. fascicularis* are estimated to number about 15,000. They are agricultural pests and threaten the conservation status of some endemic birds (Temple, 1974). Some have been trapped for export or breeding purposes, and the potential for expanding these activities is recognized (A.W. Owadally, pers. comm., 1980).

South Africa*. In the year 1979-1980, a total of 4,340 indigenous vervet monkeys (*C. aethiops pygerythrus*) and chacma baboons (*P. ursinus*) were used for a variety of industrial and research purposes in South Africa. This makes South Africa one of the world's larger primate users, comparable to Canada or France (Goosen *et al.*, 1982; pers. comms. from L.A. Carter, 1982; G. de Graaf, 1980; D.J. Goosen, 1982; and the Directors of Nature Conservation for Orange Free State, 1981, Transvaal, 1980, Natal, 1980, and Cape Province, 1980). The two species each contributed about half of the total usage, and nearly two-thirds of all use for both species occurred in the Transvaal.

Both vervets and chacma baboons are regarded as agricultural pests, and in the year 1981-1982, about 3,000 baboons were killed in the Limpopo Valley alone (D.J. Goosen, pers. comm., 1982). No systematic breeding has therefore been attempted. An index of laboratory animal use, covering primates, is in preparation by the South Africa Association for Laboratory Animal Science in conjunction with the South African Medical Research Council, and should be available in 1983. It will be interesting to see whether the use of *S. sciureus*, a species imported in large numbers between 1979 and 1981 (Kavanagh, this volume), appears in the new index.

Africa: Overview.

Apart from Kenya and South Africa, little primate research and captive breeding of primates occurs in Africa. Considering the richness of Africa's primate fauna and the extensive economic links between many of the continent's countries and the user countries in Europe (e.g. the French and British Commonwealths), this is perhaps surprising (and regrettable).

F. The Americas

Argentina*. The Argentine Primate Center (CAPRIM) was founded in 1973 under the Argentine Program for Primatological Resources (PARPRI). As of 1979, it accomodated a breeding colony of 170 *Saimiri sciureus*, 110 *Callithrix jacchus*, 53 tufted capuchins *(Cebus apella)* and 35 black howlers *(Alouatta caraya)* (Colillas, 1979).

In 1978, the Neurobiological Institute Foundation (FIDNEU) started to build a breeding facility with a target capacity of 800 pairs of *C. jacchus* (Colillas, 1979; E.O. Gonzalez Ruiz, pers. comm., 1981).

There is also a breeding colony of 300 *Cebus apella*, developed by WHO in 1979 with the collaboration of the School of Medicine of the Universidad de El Salvador (O. Colillas, pers. comm., 1983). This colony during 1983 is going to be transferred to the Neurobiological Institute Foundation (FIDNEU).

The trend of primate use in Argentina is increasing but is dependent on the results of breeding colonies. In 1982, breeding colonies produced a total of 95 primates, of which 42% were *Callithrix jacchus*, 35% *Saimiri sciureus* and 23% *Cebus apella* (O. Colillas, pers. comm., 1983). In 1982, 45 primates were used at six institutions in joint projects. The most heavily used were squirrel monkeys. The research projects were on trypanosomiasis, hemorrhagic fever, malnutrition, and reproductive physiology.

Barbados*. Introduced green monkeys (*Cercopithecus aethiops sabaeus*) are a serious agricultural pest (Baulu, 1981a). About 300 each year are trapped for research use by the University of West Indies or for export (J. Baulu, pers. comm., 1981). Plans exist for a breeding and research center with a target production of 500 each year, to be developed by the Caribbean Agricultural Research and Development Institute (CARDI Pamphlet MPS. 1-80; Baulu, 1981b; see also Anon., 1982b).

Brazil*. Plans to establish primate centers in Brazil were first discussed at a special meeting in Rio de Janeiro in 1975. At this meeting, three primate centers were mentioned, one to be created in Rio de Janeiro, one in Belem and the last in Brasilia. The Rio de Janeiro Primate Center was founded in November, 1979, and concentrates on the endangered species of the Atlantic forest region (especially *Leontopithecus* and *Callithrix*; Mallinson, 1984). The National Primate Center in Belem was established shortly thereafter and now houses a number of Amazonian primate species. The Brasilia Primate Center is now under construction, and should be completed in the next few years. In addition to these three primate centers, a number of other institutions and research facilities maintain primate colonies for research purposes, and most of them focus on relatively abundant species such as *Callithrix jacchus* and *Cebus apella*. A review of all breeding projects is provided by Faria de Santos (1984), and indicates that Brazil is far more active in primate breeding and research than any other South American country (also pers. comm. from A. Rylands, 1980; J.M. Ayres, 1982; R.C. Best, 1982; C. Torres, 1981; F. de P. Pinheiro, 1981; and R.A. Mittermeier, 1984). All breeding in Brazil at this time, however, is for domestic use and not for export.

Canada. In the years 1975-1978, an average of 5,268 primates were in stock each year in Canada, of which an average of 4,320 (80%) were used terminally and had to be replaced each year (Gilman, 1979). This level of terminal use, and the overall number of primates involved, is almost exactly the same as that of France, one of the biggest European users (see above). The most heavily used species in 1978 were *M. fascicularis* (57.2%), *M. mulatta* (22.1%) and *Cercopithecus* spp. (probably *C. aethiops*: 10.8%). The major uses of primates in Canada were for the production and testing of vaccines (especially polio and measles) and for pharmaceutical testing. The strong correlation between the use of these species, a very high proportion of terminal use, and large-scale vaccine production and testing is apparent. Recent decline in primate use is indicated by imports: 3,474 in 1979 and 2,635 in 1980, almost all from the U.S.A. (Kavanagh, this volume).

Until the Health Protection Branch established a *M. fascicularis* breeding colony at Ottawa in 1978-1979, no breeding programs had been reported. There is still a reluctance to breed primates in user institutions (e.g., University of Montreal) (J.B. Heppes & L.-P. Chenier, pers. comms., 1982).

Colombia*. As of 1981, the PAHO-supported Nonhuman Primate Program had resulted in the construction of one facility capable of housing 30 pairs of night monkeys (*Aotus* spp.) at Armero (WHO, 1981). Plans for this facility had been announced in 1978 (Kuhn, 1978). Funds were being sought in 1981 to establish a second colony of 50 pairs of *Aotus* spp. Other than these recent efforts, large-scale ranching of *Saimiri sciureus* was attempted on an island near Leticia in the late 1960's and early 1970's. This program was not successful as of 1972 (Mittermeier *et al.*, 1977), but no recent information is available.

Mexico*. As of 1981, a certain amount of importation for research and other purposes was reported for Mexico (J.J.A. Reyes Rodriguez, pers. comm., 1982), mostly involving guenons (*Cercopithecus* spp.), *Erythrocebus patas* and *M. fascicularis*. In 1974 a substantial colony of *Macaca arctoides* was established on an island in Lake Catemaco, Veracruz, and this colony is expanding steadily; the animals are used for non-invasive observational work (Estrada & Estrada, 1981; Rodriguez *et al.*, 1982).

Peru*. In 1976, construction began on the Primate Reproduction and Conservation Station at Iquitos, and as of 1981, a stock of 587 primates, mostly *Saimiri sciureus* and *Saguinus mystax*, had been acquired (PAHO/WHO, 1980; Kuhn, 1981; WHO, 1981). In addition to captive facilities, free-range ranching of *Saimiri sciureus*, *Aotus* spp. and *Saguinus mystax* is being tried under the adjacent 'Proyecto Islas'. This concerted breeding program may be parallelled by support of field surveys and ecological studies. Up to 1980, about 800 primates annually were being made available by Peru for export for biomedical uses (Blood, 1980). Between 1980 and 1982, however, the numbers actually exported decreased from about 500 to about 300 (A. Brack Egg & P. Soini, pers. comms., 1980), these being exported to, or via, the U.S. National Institutes of Health facilities in Miami, Florida. Very few, if any, of the primates exported from this project were captive-bred (D. Mack, pers. comm., 1984).

The Americas: Overview.

The Americas include the largest consumer and user of primates (U.S.A., see Eudey & Mack, this volume), a major but declining consumer of Old World monkeys (Canada), and several countries with expanding programs for the use and/or breeding of their indigenous primate species (Argentina, Brazil, Colombia and Peru). Canada is similar to France in its large volume of primates used for terminal experiments and seems to have given thought to captive breeding as belatedly as any of the European nations. Several of the recent primate research and supply projects in South America (in Colombia and Peru) have been supported by the Pan-American Health Organization; others (in Brazil, Argentina and Mexico) reflect the growing regional research interest in primates. Populations of introduced Old World monkeys in the Caribbean have great potential, both as source of wild-caught specimens for export and as the basis for the development of local research programs.

III. Conclusions

At the end of the 1970's and the very beginning of the 1980's, the total number of primates (of all species) used annually in reported research and industrial work in countries other than the U.S.A. was probably about 50,000 (Table 4). Some 15,000-20,000 of these were used in the E.E.C., mostly in the U.K., France, West Germany, Italy and the Netherlands. Other major consumers were Taiwan, Japan, South Africa, Canada, the U.S.S.R., Sweden, India and China. These 13 countries each used from 1,000-9,000 individuals each year, and together they accounted for almost all reported primate usage outside the United States. The U.S.A. alone accounts for about 50,000 to 60,000 primates annually for research use (Eudey and Mack, this volume).

Most of the primates used outside the U.S.A. were used terminally, especially in the industrial production and testing of vaccines and other pharmaceuticals; primates, therefore, had to be replaced by either wild-caught or captive-bred animals. Since less than 5,000 primates were produced annually by captive breeding in this period (Table 4), and in light of what is known of the types of usage in each country reviewed above, it seems clear that some 80-90% of the total used each year must have come from the wild.

TABLE 4
BREEDING AND USE OF PRIMATES IN COUNTRIES MENTIONED IN THE TEXT (EXCLUDING THE U.S.A.)

		Annual number		Trend in:	
Country	Year	used	bred	use	breeding
Algeria*	1982	some	?	?	up?
Argentina*	1982	45	90	up	up
Australia	1975-9	248	0	stable	stable
Barbados*	1981	300	0	up	up
Belgium	1977	637	0	down	up?
Brazil*	1982	some	some	up	up
Canada	1975-8	4,320	0	stable	up
China*	1982	1,000	700	up	up
Colombia*	1981	some	10's	up?	up
Denmark	1979	268	0	down	stable
Finland	1978	5	1	stable	up
France	1977	5,233	176	stable	up
Gabon*	Recent	some	some	?	?
Germany (West)	1977	2,372	1,013	down	up
Greece	1974-82	110^{1}	?	?	?
India*	1979	1,417	45	?	up
Indonesia*	1982	100	100's	?	up
Ireland	1978	3	0	stable	stable
Israel	1980	95	2	?	up
Italy	1978	1,900	0	up	up
Japan*	1980	5,349	450?	stable	up
Kenya*	1981	100's	46	up	up
Madagascar*	1979	some	10's	?	up?
Malaysia*	1980	30	10's	down	up
Mauritius*	Recent	some	some	up	up
Mexico*	Recent	670^{1}	10's	?	up
Netherlands	1977	1,774	264	stable	up
Peru*	Recent	100's	100's	up	up
Philippines*	Recent	some	10's	up	up
South Africa*	1979-80	4,340	0	stable	stable
Spain	1979	10	0	stable	stable
Sweden	1978	1,586	43	stable	up
Switzerland	1980	616	122	up	up
Taiwan*	1978	$6,557^{1}$	0	stable	stable
United Kingdom	1978	$9,048^{2}$	745	down	up
U.S.S.R.	Recent	$2,000^{1}$	100's	stable	up
Vietnam*	1982	some	some	?	?
Approximate annual total	Recent	50,100	4,657		
Ratio		10.8	1		

Key to Table:
some = Number uncertain but believed to be below 100; taken as 50 during calculation of totals (in these calculations, 10's taken as 20, 100's taken as 200);
Recent = late 1970's, early 1980's.
[1] Number based on imports.
[2] Number results from subtracting known minimum exports from imports.
* Habitat country.

The projects in which most primates were used, involving substantial investment in facilities and equipment, tended to be permanent and thus required continued supplies from year to year. Nevertheless, usage levels generally decreased considerably during the 1970's, and a further drop may have occurred in the early 1980's; this is based on the general decline of imports by user nations (see Kavanagh, this volume). Given the heterogenous nature of some of our data, it is difficult to be sure of the details of recent trends in use, though we believe that major patterns have been identified. Chief among them is that the rising cost and increasing lack of availability of primates during the 1970's and early 1980's have greatly stimulated the increased efficiency with which each animal is used. Better experimental techniques and greater rigor in the use of standardized animals should continue to improve the efficiency of primate use in scientific research and encourage the growth of captive breeding, regardless of the state of supply of primates from the wild. This is not, however, necessarily the case for industrial primate use, for which wild-caught primates are adequate, and which must be very strongly influenced by market factors (i.e., the price of primates). If wild-caught primates continue to be relatively expensive in comparison to other research animals, then procedures aimed at more efficient use of them, or even their replacement, will continue to be developed and applied; if they become cheaper, this process could be arrested. In any case, further reductions in primate use by developed countries are likely to be compensated for in global terms by increased usage among those of the developing world, where primate-based research and industrial users are proliferating. The demand for safe vaccines and other pharmaceuticals must surely rise as the human population continues to increase worldwide. This is best shown by the growth of industries using indigenous primates for local public health purposes in both China and India.

In the recent past, the most heavily used primates in countries other than the U.S.A. have been guenons (almost entirely green monkeys, *Cercopithecus aethiops*), macaques (*M. fascicularis* & *M. mulatta*), baboons (*Papio* spp.), marmosets (*Callithrix* spp., but especially *C. jacchus*), tamarins (*Saguinus* spp.) and squirrel monkeys (*Saimiri sciureus*), although there is considerable use of some other species in certain countries (e.g., France's use of *Erythrocebus patas*).

In the late 1970's and very early 1980's, some 4,000-5,000 primates of all species were bred for use annually in the various user and exporter countries, excluding the United States (Table 4), with an upward trend in number of primates bred and a proliferation of breeding centers. Of the 13 major users, only Taiwan and South Africa showed no sign of increased breeding. Given the great investment of time and money needed to establish a productive breeding colony, however, and a corresponding reluctance on the part of private industries to invest in breeding colonies, it seems unlikely that more than an extrapolated total of 7,000-9,000 primates will be captive-bred outside the U.S.A. by the mid-1980's. Although some countries may attain self-sufficiency in certain or even all species, there will continue to be a global shortfall of at least 20,000-30,000 in about 1985. These animals will have to be wild-caught, but it should be noted that this number is dramatically less than was the case in the past. Twenty years ago, for example, the number of primates taken from the wild or killed in the process probably exceeded a million animals per year (see Kavanagh, 1983a and this volume).

Patterns of breeding and use by the late 1980's are rather unpredictable. If the availability of wild-caught primates were to increase substantially, the surplus would doubtless be taken up, since the cost of each animal would fall and the industrial infrastructure for use would still exist. This would particularly apply to the export market for breeders in habitat countries in partial competition with exporters of wild-caught animals of the same species. This consideration appears to have led a recent World Health Organization report (Hiddleston & Smith, 1982) to decline to support captive breeding of *M. fascicularis* in Indonesia. The report instead advocates an indefinite, large-scale export of wild-caught macaques from habitat areas disturbed by a massive human colonization program in that country. A feasibility study of this recommendation has already been carried out. (J. MacKinnon, pers. comm., 1982). If the recommendation is carried out, such a development could devastate those fledgling captive-breeding projects which exist in Malaysia, the Philippines and Indonesia

TABLE 5

BREEDING AND USE OF PRIMATES IN COUNTRIES NOT MENTIONED IN THE TEXT

Country	Little or no breeding/use	Some low level breeding/use	Sources: personal communications
Angola*	+		M.J. Braga, 1982
Bahamas	+		J.H. Davies, 1982
Bangladesh*	+		S.P. Gittins, 1981 R.C.D. Olivier, 1979
Belize*	+		O. Rosado, 1982
Benin*	+		A. Szaniawski, 1981
Bhutan*	+		Director of Forests, 1982
Bolivia*	+		A.G. Pook, 1980 O. Suarez Morales, 1982
Botswana*	+		Director of Veterinary Services, Gaborone, 1980
Burma*	+		J.L. Anderson, 1980
Cameroun*	+		A.A. Allo, 1980
Cent. Afr. Rep.*	+		C.A. Spinage, 1980
Chile		+	I. Castro Poblete, 1982 J. de la S. Benavente
Costa Rica*	+		G.A. Flores Gamboa, 1982
Gambia*	+		P. Steele, 1982
Gilbraltar (U.K.)*		+	J.E. Fa, 1982
Guatemala*	+		J.C. Cardona Paiz, 1982
Hong Kong (U.K.)*		+	F.P. Lisowski, 1982 C. Huxley, 1982 T. Sharr, 1982
Hungary		+	Ervin Szenes, 1982
Luxembourg	+		P. Decker, 1982
Mozambique*	+		C. Nuvunga, 1982
Morocco*	+		D.M. Taub, 1982
Nepal*	+		Dept. of Wildlife Conservation, 1981
New Zealand	+		G.J. Blake, 1981
Nicaragua*	+		S. Estrada, 1981
Nigeria*	+		J.F. Oates, 1982
Norway	+		D. Lundgren, 1980 P.J. Schei, 1981
Pakistan*		+	A.F. Richard, 1982 Kalimullah Shirazi, 1982
Panama*		+	I.R. Diaz, 1982 N. Smyth, 1981
Poland		+	Kavanagh (this volume)
Romania		+	Kavanagh (this volume)
Rwanda*	+		R. Aveling, 1982
Saint Lucia (W.I.)	+		G.L. Charles, 1982
Senegal*	+		Director of Waters & Forests, 1981 M. Harrison, 1979
Sierra Leone*	+		J.F. Oates, 1980
Singapore*		+	R. Rajakrishna, 1982
Somalia*	+		P. Messeri, 1982
Sri Lanka*	+		W.P.J. Dittus, 1979
Sudan*	+		M. Hall, 1981
Suriname*	+		Nature Division/Forest Conservation Service, 1982
Tanzania*	+		B.A. Kamara, 1982
Thailand*	+		Phairot Suvanakorn, 1982 W.Y. Brockelman, 1980
Trinidad & Tobago*	+		Bheesham Ramdial, 1982
Tunisia	+		J. Saadallah, 1982
Uganda*	+		J.M. Okua, 1982
Upper Volta*	+		B. Bousquet, 1982
Venezuela*		+	H. Ortega, 1981 T. Blohm, 1980
Yugoslavia		+	Kavanagh (this volume)
Zambia*	+		C.S. Mukelabai, 1982
Zimbabwe*	+		C.A.M. Attwell, 1982 D.H.M. Cumming, 1982 J.B. Condy, 1980 E.M. Jones, 1982

* Countries with indigenous or introduced feral primates

itself, while providing user countries with perhaps only short-term industrial advantages (see above).

If introduced populations of *C. aethiops* and *M. fascicularis* in the West Indies or Mauritius were to be properly managed for export (and/or local use), this might also slow down the worldwide shift in usage from wild-caught to captive-bred primates. Since these populations are serious agricultural pests, however, and injurious to endemic species, their exploitation for laboratory use would seem to hold greater potential for long-term advantages to both habitat and user countries.

Other factors which could have a significant influence on patterns of primate breeding and use include the imposition or relaxation of export bans or quotas in actual or potential source countries. Such bans affected many American and Asian nations in the 1970's (see Kavanagh & Bennett, this volume). Unpredictable changes in legislation will always jeopardize the supply of wild-caught primates, and this should be a strong incentive for the establishment of breeding facilities ultimately adequate to satisfy the worldwide demand for primates for all uses.

In conclusion, until adequate management surveys in habitat countries have been done, and balanced harvesting programs (including captive breeding) have been established, accurate prediction in trends of primate breeding and use will continue to be difficult.

IV. Summary

Information on recent primate breeding and use in 87 countries outside the U.S.A. is considered. Annual worldwide use approximated 50,000 in the period 1977-1982, 80-90% being estimated to have come from the wild to replace individuals used terminally. Thirteen countries accounted for more than 90% of total usage. They are listed in descending rank with an indication of usage trends in each case: *United Kingdom* (decreasing); *Taiwan* (decreasing); *Japan* (stable); *France* (stable); *South Africa* (stable); *Canada* (decreasing); *West Germany* (decreasing); *Soviet Union* (stable); *Italy* (increasing); the *Netherlands* (stable); *Sweden* (stable); *India* (increasing); and *China* (increasing). Some 80-90% of all primates used were Old World monkeys (virtually all cercopithecines), mostly of the following taxa: *Cercopithecus aethiops*, *Macaca fascicularis*, *Macaca mulatta*, *Erythrocebus patas* and *Papio* spp. Commonly used New World species included: *Callithrix jacchus*, *Saguinus oedipus* and *Saimiri sciureus*. Primate usage has decreased greatly since the 1960's and during the 1970's, fueled by decreasing availability and rising cost per animal, which have also encouraged increased captive breeding. All of the major users except Taiwan and South Africa are reportedly increasing the numbers of primates bred; among smaller users, only Switzerland breeds a significant number, but breeding and research colonies have proliferated among many exporting nations. If the cost of wild-caught primates remains relatively high, their usage should ultimately be replaced by captive-bred individuals or techniques not requiring live primates; however, this is unlikely to occur before the 1990's at the earliest.

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APPENDIX A
SPECIES MENTIONED IN THE TEXT OR TABLES

Scientific name	Family	Common Name
Alouatta caraya	Cebidae	black howler monkey
Aotus spp.	Cebidae	night monkeys
Ateles paniscus	Cebidae	black spider monkey
Callicebus moloch	Cebidae	titi monkey
Callimico goeldii	Callimiconidae	Goeldi's monkey
Callithrix argentata	Callitrichidae	bare-ear marmosets (incl. silvery marmoset, black-tailed marmoset)
Callithrix jacchus	Calitrichidae	common marmoset
Callithrix penicillata	Callitrichidae	black-tufted-ear marmoset
Cebus apella	Cebidae	tufted capuchin
Cercocebus spp.	Cercopithecidae	mangabey
Cercocebus albigena	Cercopithecidae	gray-cheeked mangabey
Cercocebus galeritus	Cercopithecidae	agile mangabey
Cercocebus torquatus	Cercopithecidae	sooty mangabey, cherry-topped mangabey, cherry-crowned mangabey, white-collared mangabey.
Cercopithecus aethiops	Cercopithecidae	green monkey/vervet
Cercopithecus diana	Cercopithecidae	Diana monkey
Cercopithecus mitis	Cercopithecidae	blue monkey
Cercopithecus neglectus	Cercopithecidae	De Brazza's monkey
Cercopithecus petaurista	Cercopithecidae	lesser white-nosed guenon
Cercopithecus spp.	Cercopithecidae	guenons
Colobus spp.	Cercopithecidae	colobus monkeys
Erythrocebus patas	Cercopithecidae	patas monkey
Galago of crassicaudatus	Lorisidae	thick-tailed bushbaby
Galago senegalensis	Lorisidae	lesser bushbaby
Galago demidovii	Lorisidae	dwarf galago
Hylobates lar	Hylobatidae	lar gibbon, white handed gibbon
Lemur catta	Lemuridae	ring-tailed lemur
Lemur fulvus	Lemuridae	brown lemur
Macaca arctoides	Cercopithecidae	stump-tailed macaque, bear macaque
Macaca assamensis	Cercopithecidae	Assamese macaque
Macaca cyclopis	Cercopithecidae	Taiwanese macaque
Macaca fascicularis	Cercopithecidae	crab-eating, long-tailed or cynomolgus macaque
Macaca fuscata	Cercopithecidae	Japanese macaque
Macaca mulatta	Cercopithecidae	rhesus macaque, rhesus monkey
Macaca nemestrina	Cercopithecidae	pig-tailed macaque
Macaca radiata	Cercopithecidae	bonnet macaque
Macaca sylvanus	Cercopithecidae	Barbary macaque
Macaca tonkeana	Cercopithecidae	Tonkean macaque
Miopithecus talapoin	Cercopithecidae	talapoin monkey
Nycticebus coucang	Lorisidae	slow loris
Pan troglodytes	Pongidae	chimpanzee
Papio spp.	Cercopithecidae	baboons
Papio hamadryas	Cercopithecidae	hamadryas baboon
Papio ursinus	Cercopithecidae	chacma baboon
Perodicticus potto	Lorisidae	potto
Presbytis melalophos	Cercopithecidae	banded langur
Presbytis cristata	Cercopithecidae	silvered langur
Presbytis entellus	Cercopithecidae	gray or hanuman langur
Saguinus fuscicollis	Callitrichidae	saddleback tamarin
Saguinus labiatus	Callitrichidae	red-bellied tamarin
Saguinus mystax	Callitrichidae	moustached tamarin
Saguinus oedipus	Callitrichidae	cotton-top tamarin
Saimiri sciureus	Cebidae	squirrel monkey

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Use of Primates and Captive Breeding Programs in The United States

Ardith Eudey
and
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I. Introduction

During the 20th century, the U.S. has been the major importer and user of primates (see Mack & Eudey, this volume; Kavanagh, this volume). Records maintained by the U.S. Bureau of Biological Survey (Banks, 1976) suggest that importations of primates have been used primarily in biomedical research. Some primates, especially Neotropical species such as the squirrel monkey (*Saimiri sciureus*), were imported in significant numbers for the pet trade prior to 1975, the year the U.S. Public Health Service began prohibiting such importations.

The United States first began using large numbers of primates for the study of poliomyelitis, a modern disease in epidemic form, of which the first outbreak occurred in 1877 in Sweden. Following the demonstration by K. Landsteiner and E. Popper (1908, 1909) that the spinal cord of chimpanzees (*Pan troglodytes*), baboons (*Papio* spp.), and rhesus monkeys (*Macaca mulatta*) could be affected by poliovirus, Old World primates, especially rhesus monkeys, were used to study the neurological effects of the virus.

The U.S. Bureau of Biological Survey records indicate a sharp rise in mammal imports during 1910-1914, attributed in part to large volumes of monkeys imported for "laboratory and pathological experiments" (Banks, 1976). These experiments were probably part of poliomyelitis research.

After 1932, as efforts were made to define the poliovirus, monkeys, especially rhesus monkeys, became the principal mammal import into the United States (Banks, 1976). In the late 1940's, J. Salk, at the request of the National Foundation of Infantile Paralysis, organized a project using about 30,000 monkeys to determine the number and distribution of different immunological poliovirus types. However, in 1949, poliovirus of all three known types was demonstrated to multiply in human tissue culture and the multiplication was found to be accompanied by cytolgical changes detected microscopically (Enders, Weller, and Robbins, 1949). This demonstration permitted many tests, including the quantitative determination of the presence of poliovirus, to be performed in vitro, thereby eliminating the need for animals in many studies. The history of primate use in poliomyelitis research is reviewed by LeCornu and Rowan (1979).

The development and testing of poliomyelitis vaccines during the 1950's and early 1960's required substantially greater numbers of primates than did the earlier study of poliovirus and its neurological effects. For six years about 200,000 rhesus macaques were imported annually from India for these purposes (Inskipp and Wells, 1979). A "killed vaccine" or inactivated virulent virus vaccine was developed by J. Salk in 1953, and in 1962, an oral vaccine was developed from five attenuated virus by A.B. Sabin. Monkeys were used in the production and testing of both vaccines. Primary kidney-cell culture from monkeys has since served as the main substrate in poliovirus production, although it appears possible that human material might have been used instead (LeCornu and Rowan, 1979).

Subsequent reduction in the demand for primates has accompanied the development of stable human diploid-cell lines for oral poliomyelitis vaccine production. Human cell strains are unsuitable for inactivated vaccine production at present, although future use of cell lines of neoplastic origin could eliminate the demand for monkeys in the virus production step of vaccine development (LeCornu & Rowan, 1979). Although tissue cultures made from the kidneys of green monkeys (*Cercopithecus aethiops*) are used for the production of the inactive vaccine, improvements in the techniques for producing primary or secondary cell cultures have reduced the number of monkeys required for this process (LeCornu & Rowan, 1979). Rhesus macaques continue to be used for safety testing of vaccines (U.S. Public Health Service, 1956), but reduction of present numbers used may be possible (LeCornu & Rowan, 1979). The natural decline in number of people seeking vaccination against poliomyelitis after the massive immunization program of the early 1960's also has contributed to the reduced demand for primates.

The first systematic use of New World primates in biomedical research appears to have been in the investigation of yellow fever. Following the discovery that rhesus monkeys were susceptible to yellow fever (Stokes, Bauer, and Hudson, 1928), a wide range of Neotropical primates was tested for susceptibility by N.C. Davis (1930a, b, c; 1931; Davis and Shannon, 1929). The results suggested that none was suitable for laboratory investigation. Subsequently, the susceptibility of several New World primate species was re-examined, and cotton-top tamarins (*Saguinus oedipus*), squirrel monkeys (*Saimiri sciureus*), and night monkeys (*Aotus* spp.) began to be used for yellow fever studies at South American facilities (Laemmert, 1944; Bates, 1944; Bates & Roca-Garcia, 1945a & b). Much of the early research during the 1940's was conducted in Colombia by M. Bates and M. Roca-Garcia under the auspices of the Ministry of Labor, Hygiene and Social Welfare of the government of Colombia and of the Rockefeller Foundation (see especially Bates & Roca-Garcia, 1946).

Above: The night monkeys (*Aotus* spp.), also known as owl monkeys or douroucoulis, are important in research on malaria and yellow fever and also in eye research, and are still imported into the U.S. in small numbers. Once thought to consist of just one polytypic species, the genus is now divided into nine species. The individual depicted here is from Panama (photo by R. A. Mittermeier).

Below: Group of night monkeys from Peruvian Amazonia (photo by R.A. Mittermeier).

Squirrel monkeys have been the most commonly used New World primate in biomedical research within the United States. Experimental use and laboratory colonization of squirrel monkeys was initiated about 1930 by H. Kluver (1933) for behavioral research at the University of Chicago. A second colony of squirrel monkeys was established in the United States in 1949, but the species was not actually used in organized biomedical research until 1958 (see Cooper, 1968; Beischer, 1968). The large number of squirrel monkeys used in biomedical research appears to be the result of their ready availability in the pet trade within the United States (Cooper, 1968; Porter, pers. comm.). Trade in Neotropical primates developed over a 25-year period beginning in the 1940's and was both stimulated by and dependent on the growth of commercial air freight transportation between Miami, Florida and the major Amazonian collection centers at Iquitos, Peru and Leticia, Colombia. By 1964, the Neotropics had become the principal supplier of primates to the Untied States, and during the period 1968-1972 imports of squirrel monkeys exceeded those of rhesus monkeys (Mack & Eudey, this volume). South America continued to dominate importations of primates into the United States until the imposition of export bans by Peru and Colombia in 1973 and 1974, respectively. In 1975 the U.S. Public Health Service implemented regulations prohibiting the importation of primates into the United States for the pet trade. Subsequently, most of the primates imported from Neotropical countries were diverted into biomedical research.

II. Current Use and Recruitment of Primates in the United States

The Interagency Primate Steering Committee (IPSC), National Institute of Health, U.S. Department of Health and Human Services, has been collecting information on the number of animals needed annually for primate experimentation (IPSC, 1978; Held, 1982). According to their data, 33,912 primates were required for health-related or biomedical activities in the U.S. in 1977, and an estimated 22,650 primates were needed in 1982 (Table 1).

The 1982 estimates of primate needs show approximately a one-third reduction over the 1977 figures (Table 1). Reductions are apparent for six species: night monkeys (*Aotus* spp.); squirrel monkeys (*Saimiri sciureus*); common or white tufted-ear marmosets (*Callithrix jacchus*); chimpanzees (*Pan troglodytes*); gibbons (*Hylobates* spp., especially the white-handed gibbon *H. lar*); and rhesus monkeys (*Macaca mulatta*). The decline in use of these species is probably due to their lack of availability from source countries (see Kavanaugh & Bennett, this volume; Mack & Eudey, this volume), although termination of some research programs, such as viral cancer studies using gibbons, is also a factor. The long-tailed macaque (*Macaca fascicularis*) is the only species for which increased demand was anticipated.

IPSC's requirement of approximately 22,650 primates in 1982 was perhaps an underestimate. A more recent IPSC analysis (Wolfle, 1983) shows that 28,256 primates were recruited for biomedical activities in 1981 (Table 2). These data include the estimated numbers of animals purchased (imported or exchanged between institutions) and domestically produced (born in captive-breeding colonies). Captive-breeding programs and the recycling of primates between institutions accounted for 12,376 or 44% of the total number of primates supplied during that year (Table 2).

TABLE 1

MAJOR USES OF PRIMATES FOR HEALTH NEEDS IN THE UNITED STATES, WITH A COMPARISON OF ACTUAL NUMBERS OF PRIMATES UTILIZED IN 1977 AND NUMBERS ESTIMATED FOR 1982.

SPECIES	MAJOR USES[1]	1977[2]	1982[2]
Saguinus spp. (tamarins)	Hepatitis research, viral oncology, immunology, reproductive physiology	2,190	2,000
Aotus spp. (night monkeys)	Malaria chemotherapy, immunology, vision research	1,465	500
Saimiri sciureus (squirrel monkey)	General research, drug testing, nutrition, cardiovascular research	4,445	1,800
Callithrix jacchus (common marmoset)	General research, reproductive physiology, teratology, drug safety testing	170	—
Macaca fascicularis (long-tailed macaque)	General purpose, drug safety testing	6,005	8,000[3]
Macaca mulatta (rhesus monkey)	General purpose, production and testing of biological products and vaccines, such as poliomyelitis	14,015	6,000[3]
Other macaques	Research, especially neurosciences, including behavioral research	995	900
Cercopithecus aethiops (green monkeys)	Production of biological material, toxicology testing	2,075	1,500
Papio spp. (baboons)	General purpose, experimental surgery, reproductive physiology research	1,282	1,300
Hylobates spp (gibbons)	Cancer viruses, hepatitis B research, behavioral research	100	—
Pan troglodytes (chimpanzees)	Hepatitis research, psychobiology	180	50
Other primate species	Biomedical research in general, with many specific applications	990	600
Total		33,912	22,650

[1] Adapted from Table 1, *National Primate Plan* (Interagency Primate Steering Committee, 1978).

[2] Taken from Held (1982).

[3] "Should rhesus become more readily available, additional numbers might be used in place of cynomolgus." (Held, 1982)

The U.S. Department of Agriculture (USDA) independently compiles information on the number of primates maintained and used in the United States. Under Federal law, all U.S.

TABLE 2
UNITED STATES "NEW PRIMATE" REQUIREMENTS, 1981

	# of Animals	Mortality	Net	Percent[1]
Imported	22,454	12%[2]	—19,759	62
Domestic Production	8,645	10%[3]	7,780	24
PIC[6]	4,596	-	4,596	14
Total	35,695		32,256	100
Less re-exported[4]			-4,000	-12
"New primates"[5]			28,256	

[1] Percent of total "new primates".
[2] Estimated average mortality of imported animals.
[3] Estimated average mortality between birth and weaning.
[4] Approximately 4,000 primates exported from U.S. annually.
[5] New animals available from all sources.
[6] Placement of primates by Primate Information Clearinghouse (PIC).

Source: Taken from Wolfle (1983)

TABLE 3

PRIMATES USED IN EXPERIMENTATION IN THE UNITED STATES, 1973 THROUGH 1982.

Year	Quantity
1973	42,298
1974	51,253
1975	36,202
1976	50,115
1977	53,116
1978	57,009
1979	59,359
1980	56,024
1981	57,515
1982	46,388

Source: *Animal Welfare Enforcement* reports for FY 1973 through 1982, published by the Animal and Plant Health Inspection Service, U.S. Department of Agriculture.

TABLE 4
DOMESTIC BREEDING OF PRIMATES FOR HEALTH NEEDS IN THE UNITED STATES: NUMBERS OF YOUNG BORN ANNUALLY IN 1972, 1973, 1978, and 1981.

	NUMBERS OF YOUNG BORN ANNUALLY			
SPECIES	1972[1]	1973[2]	1978[3]	1981[4]
Sageinus spp. (tamarins)	397[5]	316[6]	248[7]	20
Aotus spp. (night monkeys)	—	2	47	44
Saimiri sciureus (squirrel monkey)	121	185	268	518
Callithrix jacchus (common marmoset)	45	43	106[8]	—[9]
Macaca fascicularis (long-tailed macaque)	127	94	125	433
Macaca mulatta (rhesus monkey)	752	991	3,518	6,049
Other macaques	454	417	386	474
Cercopithecus aethiops (green monkey)	43	33	23	165
Papio spp. (baboons)	147	120	325	515
Pan troglodytes (chimpanzee)	31+	46	47	90
Other primate species	195	211	216	337
Total	2,267+	2,415	5,203	8,645

[1] Data derived from a survey conducted by the Institute of Laboratory Animal Resources (ILAR), for the calendar year (Muckenhirn, 1975).
[2] Data derived from a survey conducted by ILAR, reported as of 1 October and thus, may be an underestimate for the calendar year (Muckenhirn, 1975).
[3] Data compiled by Peter J. Gerone, Conservation Committee, American Society of Primatologists, for the calendar year. Thirty breeding facilities were surveyed, with each primate center counted as a separate entry.
[4] Data compiled by the Interagency Primate Steering Committee, for the calendar year (see also Held, 1982). Twenty-nine breeding facilities were surveyed; all primate centers were counted as one entry.
[5] Of the total number reported, 256 (64.5%) were *Saguinus fuscicollis*.
[6] Of the total number reported, 189 (59.8%) were *Saguinus fuscicollis*.
[7] An undesignated number, no more than 59, of *Callithrix jacchus* is included in this figure.
[8] An undesignated number, no more than 59, is not included in this figure.
[9] No numbers given.

research facilities must submit information to USDA, which then publishes these figures in annual *Animal Welfare Enforcement* reports. According to these reports, between 1973 and 1982 more than a half million primates were used in research, with numbers used annually ranging from 36,000 to 60,000 (Table 3).

The figures presented by the IPSC in 1977, 1981, and 1982 (Tables 1 and 2) are much lower than those listed in *Animal Welfare Enforcement* reports for the same years (Table 3). USDA figures list the total number of primates maintained and used in a year whereas IPSC figures only provide the number of primates needed for recruitment into research each year. Thus, the IPSC figures do not account for the many thousands of primates that are maintained and re-used by facilities over the years, including those in breeding colonies. For example, 56,515 primates were used at research facilities in 1981 (Table 3), but only 28,256 or 49% were newly recruited by these facilities (Table 2). Imports accounted for only 35% of the total number of primates used in 1981.

The *National Primate Plan* (IPSC, 1978) gives information on annual requirements for the recruitment of primate species according to use and sponsors. Species are classified as being used in four kinds of activities: (1) production and testing of vaccines, (2) preparation of experimental vaccines and tissue cultures, (3) testing commercial products, and (4) study of disease processes and behavioral research. Table 4 and the information presented below summarizes information on the use of primates newly recruited for biomedical activities.

In 1977, 22,497 or 66% of all primates recruited were used in research, 6,950 or 21% for research required by law or regulation, 3,465 or 10% were used for testing, and 1,000 or 3% were used to produce biologicals (Table 1). Macaques, especially rhesus monkeys and long-tailed macaques, were in greatest demand, accounting for 21,015 or 62% of all primates used.

Additional information on primate use in the U.S. is available from data recorded on 1978 and 1979 Center for Disease Control (CDC) Primate Import documents. Importers, with the exception of federal agencies, are required to submit this document to the U.S. Public Health Service (Mack & Eudey, this volume). Section 13 of the document records "No. (of primates) Shipped or Transferred to Another Facility or Organization" for the 90-day period following their arrival in the United States. Analysis of these figures makes it possible to determine the use of imported species (and families and subfamilies) by type of institution or sponsor. Often, the kind of institution will indicate how the primates are used. Pharmaceutical or biological companies, for example, use primates primarily for the production and safety testing of products, especially vaccines (IPSC, 1978). In most cases, however, such inferences are not possible. Also, the number of primates that may have entered breeding programs cannot be inferred from most of these data.

According to CDC data, of the 28,558 primates imported in 1978 and 22,276 imported in 1979, only about 60% were actually available for use at facilities in the U.S. (see Table 6 in Mack & Eudey, this volume). Another 858 or 1.7% of total imports over the two-year period were sacrificed for tissue samples on the premises of the importer. The others either died prior to reaching user facilities or were re-exported to other countries. By the end of the 90-day post-arrival period, 14,349 of the available primates in 1978, and 13,250 in 1979, were at user facilities. Old World monkeys of the subfamily Cercopithecinae accounted for more than 82% of all acquisitions in both years. Appendix A summarizes the use of primate species by user facilities.

Table 5 summarizes the use of primates imported in 1978 and 1979 by family and institution type. The pharmaceutical and biological industry was the primary consumer of primates imported in both 1978 and 1979. This industry accounted for 5,584 or almost 40% of all primates transferred to user facilities in 1978 and 2,539 or 34% in 1979 (Table 5). Most of these primates (92% in 1978 and 81% in 1979) were cercopithecines, mainly rhesus monkeys and long-tailed macaques (Appendix A). Cebidae and Callitrichidae accounted for all of the remaining primates imported for this kind of industrial use.

Universities were the second-largest consumer of imported primates, obtaining 3,863 animals or 27% in 1978 and 2,129 or 28% in 1979 (Table 5). Of these, 1,135 primates in 1978 and 414 in 1979 were acquired by Regional Primate Research Centers, which are located on university campuses. Universities obtained large numbers of Cercopithecinae and Callitrichidae and were the primary consumers of Cebidae, Lorisidae and Tupaiidae[1] (Table 5). Some of these primates probably entered breeding programs.

Health-oriented federal agencies were the third-largest consumer of primates in both years, obtaining 1,590 or 11% of all primates imported in 1978 and 1,432 or 19% in 1979 (Table 5). In spite of the scarcity of rhesus monkeys caused by the imposition of export bans by India in 1978 and Bangladesh in 1979, these agencies experienced only a small absolute decline and a relative increase in acquisitions which probably reflects the need to use primates in certain procedures prescribed by law or regulation. Walter Reed Army Institute was the largest consumer in this category. The Armed Forces Radiobiology Research Institute (AFRRI) used 12 rhesus monkeys in 1978 and 40 long-tailed macaques in 1979. India banned export of all primates to the U.S. in 1978, in part, because their rhesus monkeys were subjects of defense-related research at AFRRI during the mid-1970's (see Wade, 1978).

Zoological gardens and other exhibitors received 65 imported primates in 1978 and 58 in 1979. This is less than 1% of all primates available during the two years. Pet dealers or individuals appear to have acquired seven primates in both 1978 and 1979; such acquisitions would have been in violation of the 1975 U.S. Public Health Service regulation which prohibits importation of primates for the pet trade. In 1978, eleven cotton-top tamarins *(Saguinus oedipus)* exported from Panama were confiscated; this tamarin does not occur in Panama but is found in the neighboring country of Colombia where its export is banned. In addition, a shipment of 20 silvered leaf monkeys (*Presbytis cristata*) from Indonesia to a U.S. zoo experienced 100% mortality.

A variety of other facilities involved in health-related research, non-medical research, and chemical testing received substantial numbers of primates in 1978 and 1979. Some of the primates also were transferred to other dealers or individuals (Table 5, Appendix A).

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[1] Tree shrews (*Tupaia glis* and other species; Family Tupaiidae) are included as primates in this chapter in order to follow the procedure used by U.S. government agencies to classify wildlife importations.

TABLE 5

USES OF PRIMATES (DIFFERENTIATED BY FAMILY) IMPORTED INTO THE UNITED STATES DURING 1978 AND 1979 BY KINDS OF INSTITUTION.

1978

FAMILY

KIND OF INSTITUTION	Tupaiidae	Lorisidae	Callitrichidae	Cebidae	Cercopithecidae		Pongidae	Total
					Cercopithecinae	Colobinae		(Percent of Use)
Pharmaceutical/ Biological	—	—	166 (33.33%)	300 (27.08%)	5,118 (41.68%)	—	—	5,584 (39.92%)
Chemical Testing	—	—	—	2 (0.18%)	296 (2.41%)	—	—	298 (2.08%)
University								
Medical School	15 (3.59%)	—	—	29 (2.62%)	331 (2.70%)	—	—	375 (2.61%)
Medical Institute	—	—	—	—	21 (0.17%)	—	—	21 (0.15%)
Primate Center	20 (4.78%)	—	79 (15.86%)	92 (8.30%)	941 (7.66%)	3 (14.29%)	—	1,135 (7.91%)
Undesignated	369 (88.28%)	14 (56.00%)	1 (0.20%)	207 (18.68%)	1,695 (13.80%)	—	—	2,286 (15.93%)
Other	—	—	—	—	46 (0.37%)	—	—	46 (0.32%)
State/ Local Health Departments	—	—	—	—	154 (1.25%)	—	—	154 (1.07%)
Hospital	—	—	89 (17.87%)	23 (2.08%)	277 (2.26%)	—	—	389 (2.71%)
Medical School	—	—	—	38 (3.43%)	478 (3.89%)	—	—	516 (3.60%)
Research Institution								
Medical	14 (3.35%)	—	—	61 (5.51%)	116 (0.94%)	—	—	191 (1.33%)
Non-medical	—	—	27 (5.42%)	6 (0.54%)	783 (6.38%)	—	—	816 (5.69%)
Holding Facility	—	—	—	—	35 (0.29%)	—	—	35 (0.24%)
Commercial Breeding	—	—	—	—	10 (0.08%)	—	—	10 (0.07%)
Unknown Research	—	—	—	—	260 (2.12%)	—	—	260 (1.8.%)
Zoological Garden	—	11 (44.00%)	7 (1.41%)	3 (0.27%)	—	18 (85.71%)	—	39 (0.27%)
Exhibition	—	—	—	8 (0.72%)	18 (0.15%)	—	—	26 (0.18%)
Animal Dealer	—	—	—	219 (19.77%)	98 (0.80%)	—	—	317 (2.21%)
Pet Dealer	—	—	—	1 (0.09%)	—	—	—	1 (0.01%)
Individual	—	—	—	5 (0.45%)	1 (0.01%)	—	—	6 (0.04%)
Import-Export	—	—	—	—	13 (0.11%)	—	—	13 (0.09%)
Governmental Non-Military								
CDC	—	—	24 (4.82%)	48 (4.33%)	3 (0.02%)	—	—	75 (0.52%)
FDA	—	—	—	—	86 (0.70%)	—	—	86 (0.60%)
NIH	—	—	105 (21.08%)	54 (4.87%)	1,258 (10.25%)	—	—	1,417 (9.88%)

TABLE 5 (cont.)

FAMILY

KIND OF INSTITUTION	Tupaiidae	Lorisidae	Callitrichidae	Cebidae	Cercopithecidae		Pongidae	Total (Percent of Use)
					Cercopithecinae	Colobinae		
PHS	—	—	—	—	12 (0.10%)	—	—	12 (0.08%)
Subtotal	—	—	129 (25.90%)	102 (9.21%)	1,359 (11.07%)	—	—	1,590 (11.08%)
Governmental								
Military								
Air Force	—	—	—	—	80 (0.65%)	—	—	80 (0.56%)
Army	—	—	—	6 (0.54%)	—	—	—	6 (0.04%)
Navy	—	—	—	—	2 (0.02%)	—	—	2 (0.01%)
AFRRI	—	—	—	—	12 (0.10%)	—	—	12 (0.08%)
Lovelace Institute	—	—	—	—	—	—	—	0
NASA	—	—	—	—	—	—	—	0
Walter Reed Army Institute	—	—	—	—	87 (0.71%)	—	—	87 (0.61%)
VA Hospital	—	—	—	6 (0.54%)	48 (0.39%)	—	—	54 (0.38%)
Subtotal	—	—	—	12 (1.04%)	229 (1.86%)	—	—	241 (1.68%)
TOTAL	418	25	498	1,108	12,279	21	0	14,349
PERCENT OF TOTAL USE	2.91%	0.17%	3.47%	7.22%	85.57%	0.15%	0	100%

1979

FAMILY

KIND OF INSTITUTION	Tupaiidae	Lorisidae	Callitrichidae	Cebidae	Cercopithecidae		Pongidae	Total (Percent of Use)
					Cercopithecinae	Colobinae		
Pharmaceutical/ Biological	—	—	395 (66.39%)	75 (13.51%)	2,069 (33.66%)	—	—	2,539 (33.97%)
Chemical Testing	—	—	—	—	30 (0.49%)	—	—	30 (0.40%)
University								
Medical School	—	—	—	25 (4.50%)	233 (3.79%)	—	—	258 (3.45%)
Medical Institute	—	—	—	—	37 (0.60%)	—	2 (100%)	39 (0.52%)
Primate Center	—	—	10 (1.68%)	17 (3.06%)	387 (6.30%)	—	—	414 (5.54%)
Undesignated	94 (81.03%)	32 (54.24%)	100 (16.81%)	115 (20.72%)	1,061 (17.26%)	—	—	1,402 (18.76%)
Other	8 (6.90%)	—	—	8 (1.44%)	—	—	—	16 (0.21%)
State/Local Health Depts.	—	—	—	—	102 (1.66%)	—	—	102 (1.36%)
Hospital	1 (0.86%)	—	56 (9.41%)	16 (2.88%)	70 (1.14%)	—	—	143 (1.91%)
Medical School	—	—	—	35 (6.31%)	70 (1.14%)	—	—	105 (1.40%)
Research Institution Medical	2 (1.72%)	—	—	13 (2.34%)	71 (1.16%)	—	—	86 (1.15%)
Non-Medical	—	—	13 (2.18%)	25 (4.50%)	329 (5.35%)	—	—	367 (4.91%)
State Research Institution								
Non-Medical	—	—	—	12 (2.16%)	—	—	—	12 (0.16%)

TABLE 5 (cont.)

1979

FAMILY

KIND OF INSTITUTION	Tupaiidae	Lorisidae	Callitrichidae	Cebidae	Cercopithecidae		Pongidae	Total (Percent of Use)
					Cercopithecinae	Colobinae		
Zoological Garden	11 (9.48%)	27 (45.76%)	7 (1.18%)	8 (1.44%)	4 (0.07%)	1 (100%)	—	58 (0.78%)
Exhibition	—	—	10 (1.68%)	1 (0.18%)	—	—	—	11 (0.15%)
Animal Dealer	—	—	—	140 (25.23%)	13 (0.21%)	—	—	153 (2.05%)
Pet Dealer	—	—	—	2 (0.36%)	—	—	—	2 (0.03%)
Individual	—	—	2 (0.34%)	3 (0.54%)	—	—	—	5 (0.07%)
Entertainment	—	—	—	3 (0.54%)	—	—	—	3 (0.04%)
Governmental Non-Military								
CDC	—	—	—	10 (1.80%)	20 (0.33%)	—	—	30 (0.40%)
FDA	—	—	—	—	833 (13.55%)	—	—	833 (11.15%)
NIH	—	—	—	21 (3.78%)	548 (8.92%)	—	—	569 (7.61%)
PHS	—	—	—	—	—	—	—	0
Subtotal	—	—	—	31 (5.59%)	1,401 (22.80%)	—	—	1,432 (19.16%)
Governmental Military								
Air Force	—	—	—	—	20 (0.33%)	—	—	20 (0.27%)
Army	—	—	2 (0.34%)	—	43 (0.70%)	—	—	45 (0.60%)
Navy	—	—	—	—	16 (0.26%)	—	—	16 (0.21%)
AFRRI	—	—	—	—	40 (0.65%)	—	—	40 (0.54%)
Lovelace Institue	—	—	—	—	20 (0.33%)	—	—	20 (0.27%)
NASA[1]	—	—	—	—	2 (0.03%)	—	—	2 (0.03%)
Walter Reed Army Institute	—	—	—	—	87 (1.42%)	—	—	87 (1.16%)
VA Hospital	—	—	—	26 (4.68%)	31 (0.50%)	—	—	57 (0.76%)
Subtotal	—	—	2 (0.34%)	26 (4.68%)	259 (4.21%)	—	—	287 (3.84%)
Pan American Health Organization	—	—	—	—	10 (0.16%)	—	—	10 (0.13%)
TOTAL	116	59	595	555	6,146	1	2	7,474
PERCENT OF TOTAL USE	1.55%	0.79%	7.96%	7.43%	82.23%	0.01%	0.03%	100%

[1] NASA may be under represented as some primates transferred to the California Institute of Technology, classified under the University category, were probably used by the NASA program.

Source: Analysis of U.S. Public Health Service, Center for Disease Control Primate Import Document 4.487B 8-75, Section 13 "No. Shipped or otherwise Transferred to another Facility or Organization," and summarized from Appendix A. Percent of total use for each family is indicated in parentheses.

III. National Program for the Acquisition and Use of Primates

In 1974, the Director of the National Institutes of Health (NIH), under the then Department of Health, Education, and Welfare (DHEW), established a steering committee to address the problem of the decreasing availability of primates for health-related research in the United States. Subsequently, this committee was expanded to include other primate-using federal agencies (including the National Science Foundation and the Department of Defense) and became the Interagency Primate Steering Committee (IPSC).

The IPSC was established initially to ensure the availability of adequate numbers of rhesus monkeys for government agencies. In the early 1970's, India established an export quota of 30,000 annually, and in 1974, the year in which the IPSC was established, the quoto was reduced further to 20,000 (Mack & Eudey, this volume). One of IPSC's goals was to establish breeding programs for this species (Held, 1982).

Shortly after its inception, the IPSC was asked to ensure adequate supplies of moustached tamarins (*Saguinus mystax*) for research on hepatitis A (Held, 1982). This species is found only in the Amazon Basin, and primate export bans imposed by Brazil, Colombia, and Peru during the late 1960's and early 1970's, had effectively cut off its supply (see Kavanagh, this volume; Mack & Eudey, this volume).

Subsequently, IPSC's responsibilities were enlarged to include a review of all use of primate species of interest to the U.S. government (Held, 1982). The *National Primate Plan* was developed by IPSC (1978) to provide information on the numbers of primate species used in research and industry and on their status in the wild, and to present a program by which all health-related activities using or requiring primates could be accomplished. A draft of the *National Primate Plan* was released for comment in November 1977, and revised in October 1978, although it was not released until 1980. By the time it was circulated, reassessment of primate needs already had occurred because of the increasing difficulty in obtaining certain species (Held, 1982).

The *National Primate Plan* identifies three programs necessary to ensure continuing U.S. primate supplies: (1) expansion of domestic breeding, (2) promotion of effective utilization of available primates, and (3) development of international programs to produce and conserve certain species.

A. Domestic Breeding of Primates

The number of primates bred in the U.S. for research increased more than three-fold over the last 10 years: from 2,267 in 1972 to 8,645 in 1981 (Table 4). Rhesus monkeys and chimpanzees are the only species bred domestically in large enough quantities to satisfy most demands by researchers based on the 1982 estimates of need (Table 1). In addition, captive-breeding programs satisfy the requirement for more than 50% of macaques (other than rhesus and long-tailed macaques), almost 40% of baboons and over 25% of squirrel monkeys, but less than 12% of all other species.

Rhesus monkeys (*Macaca mulatta*). Rhesus monkeys (or rhesus macaques, as they are also called) are general purpose primates, and their use in the production and testing of biological products and vaccines, such as polio vaccine, is required by law (Held, 1982). The estimated need for this species in 1982 was 6,000 (Table 1).

The U.S. produced less than 1,000 rhesus monkeys annually in 1972 and 1973 (Table 4). Since 1978, when the Indian rhesus monkey export ban came into effect, the U.S. has increased production of rhesus monkeys in domestic programs, from 3,518 births in 1978 to 6,049 in 1981 (Table 4). Federally-funded institutions produced 79% of these primates in 1981 (Held, 1982). Although the U.S. achieved self-sufficiency in the domestic breeding of rhesus monkeys in 1981, there is still a shortage of juvenile males 3 to 5 years of age (Mack, 1983). In 1983, federal funding for rhesus monkeys breeding colonies was curtailed (Mack, 1983), but it is too soon to evaluate how this will affect supplies.

The annual need for only 6,000 rhesus monkeys is dependent on adequate supplies of low-cost long-tailed macaques being available from source countries such as the Philippines, Indonesia and Malaysia. For many purposes, the two species are considered interchangeable (Held, 1982). In 1982, Worldwide Primates, Inc. in Miami, Florida, advertised wild-caught long-tailed macaques for sale at $225 to $290, depending on the monkey's weight. In 1981, the cost to produce one yearling rhesus monkey under a federal contract ranged from $720 to $1,420 (J.H. Vickers, pers. comm., 1982). The IPSC has indicated that if rhesus monkeys were to become more readily available and cheaper to obtain than long-tailed macaques, then additional numbers might be used (Held, 1982).

Long-tailed macaques (*Macaca fascicularis*). Long-tailed macaques (also known as crab-eating macaques) are also general purpose primates and, as a substitute for rhesus monkeys, are used in drug safety testing (Held, 1982). The estimated need for this species in 1982 was 8,000 (Table 1).

For the years 1972, 1973, and 1978, an annual average of 115 long-tailed macaques was produced domestically (Table 4). In 1981, 433 long-tailed macaques were born in U.S. breeding colonies, but this figure is far below the estimated 8,000 needed for biomedical activities in 1982 (Held, 1982). The remaining monkeys are obtained mainly from wild populations.

In 1978, the IPSC recommended that at least four general purpose breeding colonies of long-tailed macaques be established, which could produce from 3,000 to 6,000 animals annually. However, such colonies have not yet been established, largely because their continued availability from source countries makes this breeding effort economically "less compelling" (Held, 1982). The effects of a total ban on primate exports by Malaysia in June 1984 (Anon., 1984) on breeding efforts for this species remains to be seen, since long-tailed macaques are still available from the Philippines and Indonesia.

Other macaques (*Macaca* spp.). According to the IPSC (Held, 1982), about 800 other macaques are needed annually for research, especially in neurosciences and behavioral research (Table 1). More than half of these (474) were obtained through domestic breeding programs in 1981 (Table 4), primarily at special-purpose breeding colonies (Held, 1982). Most of these were probably pigtail macaques (*Macaca nemestrina*). Of 386 births in 1978, 66% were of pigtail macaques and only 9 were of stumptail macaques (*Macaca arctoides*) (Gerone, 1980). The Washington Regional Primate Research Center is the major U.S. producer of pigtail macaques, and in 1978 maintained 400 breeding females.

The use of other macaques in research appears to have declined since the mid-1970's. Prior to 1976, the stumptail macaque (*Macaca arctoides*) ranked fifth among the most commonly used primate species in the U.S. (Muckenhirn, 1975). However, in 1976, Thailand, the major supplier of this species, banned commercial export of all macaques, virtually eliminating stumptail macaques from international trade and restricting U.S. use of this species in biomedical research.

Green monkeys (*Cercopithecus aethiops*). Green monkeys are used in the production of biological material and for toxicology testing (Held, 1982). An estimated 1,500 animals were needed in 1982 (Table 1).

Domestic breeding of green monkeys has been limited because they have been readily available in large numbers from East Africa and in small numbers from the West Indies, where the species was introduced (Held, 1982; Mack & Eudey, this volume). In 1972, 1973, and 1978 the number of green monkeys bred annually averaged 33, and in 1981, the number increased to 165 (Table 4), which is just over 10% of the 1982 projected need (Table 1).

The IPSC recommended the establishment of at least two general-purpose breeding colonies capable of producing 100 monkeys annually (IPSC, 1978; Held, 1982), but this has not yet been implemented. This recommendation anticipated conservation measures in East African countries leading to restrictions on green monkey exports, actions which to date have not occurred.

Baboons (*Papio* spp.) Baboons, principally olive baboons (*Papio anubis*) and yellow baboons (*P. cynocephalus*), are general purpose primates often used in experimental surgery and research on reproductive physiology (Held, 1982). In 1982, an estimated 1,300 baboons were needed (Table 1).

For the years 1972 and 1973, baboon births in the U.S. averaged 134. Domestic production increased to 325 in 1978 and 515 in 1981 (Table 4), although the latter figure may include only baboons produced by general-purpose breeding colonies (see Held, 1982). Of the 325 baboons born in 1978, 96% were bred at the Southwest Foundation for Research and Education in Texas, which maintained 503 breeding females at that time (Gerone, 1980).

Squirrel monkeys (*Saimiri sciureus*). Squirrel monkeys are used in a variety of health-related studies including nutritional and cardiovascular research (Held, 1982). The estimated need for squirrel monkeys in 1982 was 1,800, a decrease of almost 60% from the 1977 figures (Table 1).

Domestic breeding of squirrel monkeys increased from 121 in 1972 to 518 in 1981 (Table 4). About 400 squirrel-monkeys currently are produced annually in breeding colonies supported by the U.S. Public Health Service (Held, 1982). The IPSC considers a level of 600 young bred annually to be adequate for research needs (Held, 1982).

Wild-caught squirrel monkeys are still imported commercially in large numbers from Bolivia (Mack & Eudey, this volume). Subspecies of squirrel monkeys found near Leticia, Colombia, and Iquitos, Peru are most in demand for research because of extensive baseline data on them. Since Colombia and Peru banned commercial exports of all primates in the early 1970's, these preferred subspecies are available only in limited quantities through the Pan American Health Organization (PAHO) Primate project based in Iquitos, Peru (see section on "International Programs") or from domestic breeding colonies.

Night monkeys (*Aotus* spp.). Night monkeys are the only known model for the study of malaria chemotherapy (Held, 1982). They also are used in immunological studies and vision research. An estimated 500 night monkeys were needed in 1982, a decrease of almost 66% from the 1977 figure (Table 1).

The decrease in use of night monkeys is probably the result of export bans in source countries, such as Colombia, Panama and Paraguay. The species found in northern Colombia is valuable for malaria research, but, at the present time, night monkeys are commercially available only from Bolivia. Between 1976 and 1980, the U.S. imported 944 night monkeys from Bolivia (Mack & Eudey, this volume).

Successful captive breeding of night monkeys has been rare (Held, 1982), with only 44 night monkeys reported to have been bred domestically in 1981 (Table 4). This can probably be explained by the fact that *Aotus* taxonomy is complex and, until very recently (Hershkovitz, 1983), poorly understood. In the past, species with different karyotypes have been kept together, and, in light of this, it is not at all surprising that breeding has not been successful. The IPSC (1978; Held, 1982) has recommended the establishment of a breeding colony to produce at least 150 annually, but this colony has not yet been established.

Tamarins (*Saguinus* spp.). Tamarins are used in hepatitis research, viral oncology, immunology, and the study of reproductive physiology (Held, 1982). An estimated 2,000 tamarins were needed in 1982, which is approximately the same number required in 1977 (Table 1).

Domestic breeding of tamarins declined from 397 in 1972 to only 20 in 1981 (Table 4). In 1978 the IPSC recommended annual production of at least 200 moustached tamarins (*Saguinus mystax*) and 150 cotton-top tamarins (*Saguinus oedipus*), but breeding of these two species in captivity has proven difficult. Government-supported breeding of moustached tamarins has now been initiated on a small scale, and the annual goal of production was 40 to 50 monkeys in 1982 and 1983 (Held, 1982).

Bolivia is the only Neotropical country that commercially exports large numbers of tamarins, especially the red-bellied tamarin, *S. labiatus*, and the saddle-back tamarin, *S. fuscicollis* (Mack & Eudey, this volume). However, a limited number of tamarins (*S.*

mystax and *S. fuscicollis*) are available from the Pan American Health Organization Primate Project based in Iquitos, Peru (see section on "International Programs").

Chimpanzees (*Pan troglodytes*). Chimpanzees are used in hepatitis research and in psychobiology (Held, 1982). An estimated 50 chimpanzees were needed in 1982, a decrease of 72% from the 1977 figure (Table 1).

Chimpanzees have not been commercially imported into the U.S. for research since they were listed on both the U.S. Endangered Species Act and CITES Appendix in 1977 (Mack & Eudey, this volume). As a consequence, the IPSC has assigned a high priority to developing a *National Chimpanzee Breeding Program* (IPSC, 1980; Held, 1982). In 1980, 1,235 chimpanzees were identified in the United States, and, of these, more than 1,000 were being managed by the biomedical community (Held, 1982). In 1981, 90 chimpanzees were born in the U.S. (Table 4), which is more than the estimated 50 needed for research (Table 1). A major problem confronting the success of the chimpanzee breeding program, however, is the small size of the actual breeding population. In 1980, only 180 living females had successfully produced young and only 83 males had sired offspring. Of even greater concern for long-term domestic breeding is the fact that only four captive-born males in the U.S. have bred successfully (Blood, 1980). In 1977, a federally funded facility was established at the University of Texas in Bastrop, Texas, to rehabilitate chimpanzees formerly used in research for future studies and breeding. In early 1982, the population consisted of 38 males and 36 females, 19 of which were adolescents or juveniles (Held, 1982).

B. Effective Utilization of Available Primates

The second component of the *National Primate Plan* (IPSC, 1978) stresses more effective utilization of available primates in order to reduce the numbers required for biomedical activities. Aspects of this increased utilization included recycling primates among researchers and information sharing among primate users. To facilitate these activities, the Division of Research Services of NIH awarded a contract for the development and operation of a Primate Supply Information Clearinghouse in 1977 (Held, 1982). This facility is located at the University of Washington Regional Primate Research Center, Seattle, Washington.

The number of primates placed by the Clearinghouse has almost doubled in its first five years, from 2,649 placements in 1978 to 5,033 in 1982 (Table 6). Rhesus monkeys accounted for just over a third of the placements in 1980, and this figure rose to almost 50% in 1982 (Mack, 1982; 1983). In addition, the Clearinghouse was able to satisfy 64 requests for blood and tissue samples in 1980, 123 requests in 1981, and 119 requests in 1982.

C. International Programs for the Production and Conservation of Primates

Proyecto Primates - Iquitos, Peru. In response to the imposition of export bans in the South American countries of Brazil, Colombia and Peru, NIH entered into an agreement with the Pan American Health Organization (PAHO) in 1975 that led to the establishment of a primate breeding station (Proyecto Primates) in Iquitos, Peru. Exports of wild-caught primates from Peru to the U.S. through this program began in 1976 and between 1976 and 1982, 4,144 primates were exported to the U.S. under the auspices of PAHO (Wolfle, 1983). Most of the primates were wild-caught, and the species involved were mainly moustached tamarins (*Saguinus mystax*), saddle-back tamarins (*S. fuscicollis* sspp.), and squirrel monkeys (*Saimiri sciureus*). Some of the primates imported by the U.S. under this program were subsequently re-exported to other countries (Mack & Eudey, this volume).

TABLE 6
PRIMATES PLACED BY THE PRIMATE SUPPLY INFORMATION CLEARINGHOUSE.

Year	Quantity
1978	2,649
1979	2,783
1980	3,342
1981	4,596
1982	5,033

Source: Mack, 1982; 1983.

In 1978 and 1979, the following institutions received direct imports of Peruvian primates through the PAHO program: Southwest Foundations for Education and Research (Texas); Rush-Presbyterian St. Luke's Hospital (Chicago); Delta Regional Primate Research Center (New Orleans); and the Harvard School of Public Health (Table 7). The first three institutions all reported small breeding colonies of squirrel monkeys and/or tamarins in 1978 (Gerone, 1980).

Malaysian Primate Program. In 1978 the National Institutes of Health (NIH), including the National Cancer Institute (NCI), entered into a three-year contract for the development of a primate program in Peninsular Malaysia with Cambridge University, United Kingdom. This program was endorsed by the Universiti Malaysia and Universiti Kebangsaan Malaysia. The aims of the contract included the development and coordination of field and laboratory research on Malaysian primates to study and conserve species in natural habitats. The project also addressed the use of primates displaced by habitat disturbance in research (Chivers, 1981; Kavanagh, 1981). No primates were exported to the U.S. under the NIH-Cambridge University contract which terminated on June 30, 1981.

TABLE 7
DIRECT IMPORTATIONS TO USER FACILITIES, OTHER THAN FEDERAL GOVERNMENT AGENCIES, IN THE UNITED STATES IN 1978-1979.

Species	Facility	Usable Numbers	Percent Of Total Usable	Total Usable
	1978			
Cercopithecus aethiops	Yale University	8	0.70	1,146
Macaca fascicularis	Washington RPRC	207		
	Oregon RPRC	200		
	Subtotal	407	5.92	6,880
Macaca mulatta	Washington RPRC	9		
	Roswell Park	39		
	Lowell University	20		
	Subtotal	68	1.64	4,138
Macaca nemestrina	Washington RPRC	180	31.52	571
Presbytis cristata	Washington RPRC	3		
	Minnesota Zoo[1]	0		
	Subtotal	3	100	3
Saguinus fuscicollis sspp.	Rush-Presbyterian St. Luke's Hospital	49		
	Southwest Foundation for Education and Research	27		
	Subtotal	76	100	76
Saguinus mystax	Delta RPRC	79	66.91	113
Saguinus spp.	Rush-Presbyterian St. Luke's Hospital	40	100	40
TOTAL		861	5.04	17,072[2]
	1979			
Cebuella pygmaea	Southwest Foundation for Education and Research	13	100	13
Cebus spp.	Professional entertainer	3	7.32	41
Aotus spp.	Lincoln Park Zoo	2	1.28	156[3]
Macaca fascicularis	Oregon RPRC	74		
	Washington RPRC	76		
	Subtotal	150	1.80	8,323[3]
Macaca mulatta	Yale University	18	7.76	232
Macaca nigra	Oregon RPRC	1	100	1
Pan troglodytes	LEMSIP	2	100	2
Papio (= Mandrillus) leucophaeus	Knoxville Zoo	1	100	1
Papio cynocephalus	Washington RPRC	22	100	22
Presbytis obscura	Lincoln Park Zoo	1	100	1
Saguinus fuscicollis	Rush-Presbyterian St. Luke's Hospital	56	100	56
Saguinus geoffroyi	Lincoln Park Zoo	6	100	6
Saguinus imperator	Lincoln Park Zoo	1	100	1
Saimiri sciureus	Harvard School of Public Health	8	0.98	817[3]
TOTAL		284	2.10	13,520[3]

[1] A shipment of 20 *P. cristata* from Indonesia experienced 100% mortality.

[2] This figure represents total number of primates available for use in the U.S., including all species, not just those listed in this table.

[3] Statistics for 1979 do not include any re-exports from 70 shipments arriving in the U.S. during October-December 1979, from which at least 3,061 primates were transferred to user facilities. In addition, the total figure represents total number of primates available for use in the U.S., including all species, not just those listed in this table.

Source: Data recorded on Center for Disease Control Primate Import Document 4.487B 8-75.

The International Primate Resources Program. In August 1980, the Division of Research Services (DRS), NIH, entered into a contract with the World Health Organization (WHO) to establish an International Primate Resources Program. This program was intended to make arrangements with government agencies within source countries to guarantee a continuing supply of primates for health-related activities. Through a National Cooperating Center, WHO was to organize the distribution of primates and payments for them, and this revenue would in turn be used to pay for project expenses. Initially the U.S. would receive primates exported through such a program, but any user country willing to share the expense of a project also would receive primates (Anon., 1981). To date, no other country has been willing to support the program.

IV. Summary

U.S. researchers use more primates than any other country (see Caldecott & Kavanagh, this volume, for needs of other countries). Pharmaceutical and biological industries and universities receive most of the primates imported by the United States. Cercopithecines, especially long-tailed macaques and rhesus monkeys, are the most frequently used primates in research.

During the early 1970's, the federal government was quick to respond to the reduced number of primates available from the wild. The Interagency Primate Steering Committee was created to address these issues. Funds became available for domestic primate breeding programs, and the Primate Supply Information Clearinghouse was created to recycle animals used in research. In 1981, for example, the U.S. bred over 8,600 primates and more than 5,000 animals were recycled to other institutions. Indications are that the continued success of U.S. breeding programs and efficient use of research animals already in the U.S. will probably cause a further decline in the number of animals imported from the wild.

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APPENDIX A

USES OF PRIMATES (DIFFERENTIATED BY SPECIES AND ARRANGED BY FAMILY) IMPORTED INTO THE UNITED STATES DURING 1978 AND 1979 BY KINDS OF INSTITUTION, AS DERIVED FROM U.S. PUBLIC HEALTH SERVICE, CENTER FOR DISEASE CONTROL PRIMATE IMPORT DOCUMENT 4.487B 8-75, SECTION 13 "NO. SHIPPED OR OTHERWISE TRANSFERRED TO ANOTHER FACILITY OR ORGANIZATION."

1978

SPECIES BY FAMILY	KIND OF INSTITUTION	NUMBER USED IN 90 DAYS	TOTAL NUMBER USABLE	TOTAL – NUMBER IMPORTED
TUPAIIDAE				
Tupaia glis	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	0		
	OTHER			
	University			
	Medical school	15		
	Primate center	20		
	Undesignated	369		
	Research institution			
	Medical	14		
	Subtotal	418		
	GOVERNMENTAL	0		
	TOTAL	418	515	1,320
LORISIDAE				
Galago senegalensis	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	0		
	OTHER			
	University			
	Undesignated	14		
	Zoological garden	11		
	Subtotal	25		
	GOVERNMENTAL	0		
	TOTAL	25	113	176
CALLITRICHIDAE				
Callithrix jacchus	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	66		
	OTHER	0		
	GOVERNMENTAL			
	NIH	95		
	TOTAL	161	161	248
Saguinus fuscicollis sspp.	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	0		
	OTHER			
	Hospital	49		
	Research institution			
	Non-medical	27		
	Subtotal	76		
	GOVERNMENTAL	0		
	TOTAL	76	76	82

APPENDIX A (cont.)

SPECIES BY FAMILY	KIND OF INSTITUTION	NUMBER USED IN 90 DAYS	TOTAL NUMBER USABLE	TOTAL NUMBER IMPORTED
Saguinus geoffroyi	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	0		
	OTHER			
	University			
	Undesignated	1		
	Zoological garden	7		
	Subtotal	8		
	GOVERNMENTAL	0		
	TOTAL	8	12	14
Saguinus labiatus	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	100		
	OTHER	0		
	GOVERNMENTAL	0		
	TOTAL	100	100	200
Saguinus mystax	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	0		
	OTHER			
	University			
	Primate center	79		
	GOVERNMENTAL			
	CDC	24		
	NIH	10		
	Subtotal	34		
	TOTAL	113	113	173
Saguinus oedipus	CONFISCATED	11	11	12
Saguinus spp.	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	0		
	OTHER			
	Hospital	40		
	GOVERNMENTAL	0		
	TOTAL	40	40	40
CEBIDAE				
Aotus spp.	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	94		
	OTHER			
	University			
	Primate center	26		
	Undesignated	98		
	Medical school	8		
	Research institution			
	Medical	61		
	Zoological garden	1		
	Exhibition	3		
	Animal dealer	9		
	Subtotal	206		

APPENDIX A (cont.)

SPECIES BY FAMILY	KIND OF INSTITUTION	NUMBER USED IN 90 DAYS	TOTAL NUMBER USABLE	TOTAL NUMBER IMPORTED
Aotus spp.	NON-GOVERNMENTAL			
	CDC	43		
	NIH	54		
	Subtotal	97		
	TOTAL	397	414	667
Ateles fusciceps	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	0		
	OTHER			
	University			
	Undesignated	1		
	Exhibition	1		
	Pet dealer	1		
	Subtotal	3		
	GOVERNMENTAL			
	CDC	1		
	TOTAL	4	5	15
Ateles geoffroyi	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	0		
	OTHER			
	Private individual	1		
	GOVERNMENTAL	0		
	TOTAL	1	1	1
Callicebus moloch	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	0		
	OTHER			
	Zoological garden	2		
	Exhibition	2		
	Subtotal	4		
	GOVERNMENTAL	0		
	TOTAL	4	9	11
Cebus albifrons	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	0		
	OTHER			
	Exhibition	1		
	GOVERNMENTAL	0		
	TOTAL	1	7	7
Cebus apella	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	41		
	OTHER			
	University			
	Undesignated	2		
	Research institution			
	Non-medical	6		
	Exhibition	1		
	Private individual	2		
	Subtotal	9		

APPENDIX A (cont.)

SPECIES BY FAMILY	KIND OF INSTITUTION	NUMBER USED IN 90 DAYS	TOTAL NUMBER USABLE	TOTAL NUMBER IMPORTED
Cebus apella	GOVERNMENTAL	0		
	TOTAL	52	69	98
Cebus capucinus	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	0		
	OTHER			
	Private individual	2		
	GOVERNMENTAL	0		
	TOTAL	2	8	14
Saimiri sciureus	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	165		
	OTHER			
	Chemical testing	2		
	University			
	Primate center	66		
	Medical school	29		
	Undesignated	106		
	Hospital	23		
	Medical school	30		
	Animal dealer	210		
	Subtotal	466		
	GOVERNMENTAL			
	CDC	4		
	Army	6		
	VA hospital	6		
	Subtotal	16		
	TOTAL	647	1,349	1,986
CERCOPITHECINAE				
Cercopithecus aethiops	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	931		
	OTHER			
	University			
	Medical institute	2		
	Primate Center	25		
	Undesignated	11		
	Medical school	29		
	Holding facility	35		
	Exhibition	1		
	Subtotal	103		
	GOVERNMENTAL			
	CDC	3		
	FDA	25		
	NIH	40		
	Subtotal	68		
	TOTAL	1,101	1,146	2,073
Cercopithecus mona	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	0		
	OTHER			
	Private individual	1		
	GOVERNMENTAL	0		
	TOTAL	1	1	1

APPENDIX A (cont.)

SPECIES BY FAMILY	KIND OF INSTITUTION	NUMBER USED IN 90 DAYS	TOTAL NUMBER USABLE	TOTAL NUMBER IMPORTED
Cercopithecus petaurista	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	0		
	OTHER			
	Exhibition	3		
	GOVERNMENTAL	0		
	TOTAL	3	3	3
Erythrocebus patas	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	0		
	OTHER			
	University			
	Medical school	6		
	Primate center	6		
	Undesignated	13		
	Subtotal	25		
	GOVERNMENTAL			
	NIH	10		
	TOTAL	35	60	90
Macaca arctoides	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	0		
	OTHER			
	Exhibition	9		
	GOVERNMENTAL	0		
	TOTAL	9	13	14
Macaca fascicularis	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	2,054		
	OTHER			
	Chemical testing	76		
	State/local health departments	144		
	University			
	Medical school	273		
	Primate center	580		
	Undesignated	1,261		
	Other	15		
	Hospital	147		
	Medical school/dental facility/medical facility	427		
	Research institution			
	Medical	70		
	Non-medical	138		
	Commercial breeding	10		
	Import-export	13		
	Unidentified	195		
	Subtotal	3,349		

APPENDIX A (cont.)

SPECIES BY FAMILY	KIND OF INSTITUTION	NUMBER USED IN 90 DAYS	TOTAL NUMBER USABLE	TOTAL NUMBER IMPORTED
Macaca fascicularis	GOVERNMENTAL			
	FDA	61		
	NIH	234		
	PHS	12		
	Air Force	22		
	Walter Reed Army Institute	23		
	VA hospital	19		
	Subtotal	371		
	TOTAL	5,774	6,880	13,893
Macaca mulatta	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	2,127		
	OTHER			
	Chemical testing	220		
	State/local health departments	6		
	University			
	Primate center	113		
	Research institute	20		
	Undesignated	76		
	Other	11		
	Hospital	52		
	Medical school	4		
	Research institution			
	Medical	39		
	Non-medical	222		
	Unidentified	65		
	Subtotal	828		
	GOVERNMENTAL			
	NIH	974		
	Air Force	27		
	AFRRI	12		
	VA hospital	12		
	Subtotal	1,025		
	TOTAL	3,980	4,138	5,238
Macaca nemestrina	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	2		
	OTHER			
	State/local health departments	4		
	University			
	Medical school	12		
	Primate center	180		
	Undesignated	81		
	Hospital	33		
	Medical school	12		
	Research institution			
	Medical	3		
	Subtotal	325		
	GOVERNMENTAL	0		
	TOTAL	327	571	729

APPENDIX A (cont.)

SPECIES BY FAMILY	KIND OF INSTITUTION	NUMBER USED IN 90 DAYS	TOTAL NUMBER USABLE	TOTAL NUMBER IMPORTED
Papio anubis	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	4		
	OTHER			
	University			
	Medical institute	19		
	Medical school	34		
	Primate center	37		
	Undesignated	248		
	Hospital	45		
	Medical/dental school	6		
	Research institution			
	Medical	4		
	Non-medical	421		
	Animal dealer	68		
	Subtotal	882		
	GOVERNMENTAL			
	Air Force	31		
	Navy	2		
	Walter Reed Army Institute	64		
	VA hospital	17		
	Subtotal	114		
	TOTAL	1,000	1,169	1,335
Papio hamadryas	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	0		
	OTHER			
	University			
	Medical school	5		
	Undesignated	5		
	Research institution			
	Non-medical	2		
	Subtotal	12		
	GOVERNMENTAL	0		
	TOTAL	12	12	12
Papio papio	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	0		
	OTHER			
	University			
	Medical school	1		
	Exhibition	5		
	Animal dealer	30		
	Subtotal	36		
	GOVERNMENTAL	0		
	TOTAL	36	49	50
COLOBINAE				
Colobus spp.	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	0		
	OTHER			
	Zoological garden	18		
	GOVERNMENTAL	0		
	TOTAL	18	18	20

APPENDIX A (cont.)

SPECIES BY FAMILY	KIND OF INSTITUTION	NUMBER USED IN 90 DAYS	TOTAL NUMBER USABLE	TOTAL NUMBER IMPORTED
Presbytis cristata	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	0		
	OTHER			
	University			
	Primate center	3		
	Zoological garden	0		
	Subtotal	3		
	GOVERNMENTAL	0		
	TOTAL	3	3	26
		1979		
TUPAIIDAE				
Tupaia glis	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	0		
	OTHER			
	University			
	Psychology	8		
	Undesignated	94		
	Hospital	1		
	Research institution			
	Medical	2		
	Zoological garden	11		
	Subtotal	116		
	GOVERNMENTAL	0		
	TOTAL	116	274	505
LORISIDAE				
Galago senegalensis	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	0		
	OTHER			
	University			
	Undesignated	5		
	Zoological garden	17		
	Subtotal	22		
	GOVERNMENTAL	0		
	TOTAL	22	22	24
Galago spp.	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	0		
	OTHER			
	University			
	Undesignated	27		
	GOVERNMENTAL	0		
	TOTAL	27	27	35

APPENDIX A (cont.)

SPECIES BY FAMILY	KIND OF INSTITUTION	TOTAL USED IN 90 DAYS	TOTAL NUMBER USABLE	NUMBER IMPORTED
Nycticebus coucang	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	0		
	OTHER			
	Zoological garden	10		
	GOVERNMENTAL	0		
	TOTAL	10	10	10
CALLITRICHIDAE				
Callithrix argentata	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	0		
	OTHER	0		
	GOVERNMENTAL	0		
	TOTAL	0	27	91
Callithrix jacchus	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	0		
	OTHER			
	University			
	Undesignated	100		
	Exhibition	10		
	Private individual	2		
	Subtotal	112		
	GOVERNMENTAL			
	Army	2		
	UNKNOWN	10[1]		
	TOTAL	124[1]	246[2]	464
Callithrix penicillata	UNKNOWN	4[1]		
	TOTAL	4[1]	8[2]	19
Cebuella pygmaea	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	0		
	OTHER			
	Research institution			
	Non-medical	13		
	GOVERNMENTAL	0		
	TOTAL	13	13	16
Saguinus fuscicollis	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	0		
	OTHER			
	Hospital	56		
	GOVERNMENTAL	0		
	TOTAL	56	56	60

APPENDIX A (cont.)

SPECIES BY FAMILY	KIND OF INSTITUTION	TOTAL USED IN 90 DAYS	TOTAL NUMBER USABLE	NUMBER IMPORTED
Saguinus geoffroyi	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	0		
	OTHER			
	Zoological garden	6		
	GOVERNMENTAL	0		
	TOTAL	6	6	6
Saguinus imperator	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	0		
	OTHER			
	Zoological garden	1		
	GOVERNMENTAL	0		
	TOTAL	1	1	1
Saguinus labiatus	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	98		
	OTHER	0		
	GOVERNMENTAL	0		
	TOTAL	98	98	113
Callitrichidae spp.	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	297		
	OTHER			
	University			
	Primate center	10		
	GOVERNMENTAL	0		
	UNKNOWN	240[1]		
	TOTAL	547[1]	577[2]	630
CEBIDAE				
Aotus trivirgatus	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	14		
	OTHER			
	University			
	Undesignated	12		
	Medical school	16		
	Zoological garden	2		
	Subtotal	30		
	GOVERNMENTAL			
	CDC	10		
	NIH	21		
	Subtotal	31		
	UNKNOWN	28[1]		
	TOTAL	103[1]	156[2]	177

APPENDIX A (cont.)

SPECIES BY FAMILY	KIND OF INSTITUTION	TOTAL USED IN 90 DAYS	TOTAL NUMBER USABLE	NUMBER IMPORTED
Cebus apella	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	0		
	OTHER			
	University			
	Medical school	3		
	Animal dealer	21		
	Pet dealer	1		
	Private individual	1		
	Subtotal	26		
	GOVERNMENTAL	0		
	TOTAL	26	52	59
Cebus nigrivittatus	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	0		
	OTHER			
	Exhibition	1		
	Private individual	1		
	Subtotal	2		
	GOVERNMENTAL	0		
	TOTAL	2	2	2
Cebus spp.	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	23		
	OTHER			
	University			
	Medical school	1		
	Entertainment	3		
	Subtotal	4		
	GOVERNMENTAL	0		
	TOTAL	27	41	48
Saimiri sciureus	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	38		
	OTHER			
	State research institution			
	non-medical	12		
	University			
	Medical/dental school	21		
	Primate center	17		
	Public health school	8		
	Undesignated	103		
	Hospital	16		
	Medical/dental school	19		
	Research institution			
	Medical	13		
	Non-medical	25		
	Zoological garden	6		
	Animal dealer	119		
	Pet dealer	1		
	Private individual	1		
	Subtotal	361		

APPENDIX A (cont.)

SPECIES BY FAMILY	KIND OF INSTITUTION	TOTAL USED IN 90 DAYS	TOTAL NUMBER USABLE	NUMBER IMPORTED
Saimiri sciureus	GOVERNMENTAL			
	VA hospital	26		
	UNKNOWN	56[1]		
	TOTAL	481[1]	817[2]	1,071
CERCOPITHECINAE				
Cercopithecus aethiops	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	589		
	OTHER			
	University			
	Medical school	2		
	Primate center	19		
	Undesignated	8		
	Hospital	1		
	Medical school	14		
	Subtotal	44		
	GOVERNMENTAL			
	FDA	48		
	Army	16		
	Subtotal	64		
	PAHO (Pan American Health Organization)	10		
	UNKNOWN	389[1]		
	TOTAL	1,096[1]	1,098[2]	2,604
Cercopithecus petaurista	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	0		
	OTHER			
	Zoological garden	3		
	GOVERNMENTAL	0		
	TOTAL	3	3	3
Erythrocebus patas	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	0		
	OTHER			
	University			
	Primate center	12		
	Undesignated	6		
	Subtotal	18		
	GOVERNMENTAL	0		
	TOTAL	18	18	20
Macaca arctoides	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	0		
	OTHER			
	University			
	Undesignated	12		
	GOVERNMENTAL	0		
	TOTAL	12	12	12

APPENDIX A (cont.)

SPECIES BY FAMILY	KIND OF INSTITUTION	TOTAL USED IN 90 DAYS	TOTAL NUMBER USABLE	NUMBER IMPORTED
Macaca fascicularis	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	1,324		
	OTHER			
	State/local health departments	102		
	University			
	Medical institute	15		
	Medical school	199		
	Primate center	311		
	Public health school	4		
	Radiation laboratory	1		
	Research institute	2		
	Undesignated	811		
	Hospital	69		
	Medical school	22		
	Research institution			
	Medical	46		
	Non-medical	23		
	Animal dealer	7		
	Miscellaneous	5		
	Subtotal	1,617		
	GOVERNMENTAL			
	FDA	785		
	NIH	541		
	R.A. Taft Laboratory, HEW, CDC	20		
	Army	7		
	AFRRI	40		
	Lovelace Institute	20		
	NASA	2		
	Walter Reed Army Institute	81		
	VA hospital	22		
	Subtotal	1,518		
	UNKNOWN	1,822[1]		
	TOTAL	6,281[1]	8,323[2]	14,522
Macaca mulatta	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	156		
	OTHER			
	University			
	Undesignated	22		
	GOVERNMENTAL			
	NIH	7		
	TOTAL	185	232	244
Macaca nemestrina	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	0		
	OTHER			
	University			
	Medical center	10		
	Undesignated	43		
	Hospital medical school	12		
	Subtotal	65		

APPENDIX A (cont.)

SPECIES BY FAMILY	KIND OF INSTITUTION	TOTAL USED IN 90 DAYS	TOTAL NUMBER USABLE	NUMBER IMPORTED
Macaca nemestrina	GOVERNMENTAL			
	Army	9		
	UNKNOWN	11[1]		
	TOTAL	85[1]	265[2]	284
Macaca nigra	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	0		
	OTHER			
	University			
	Primate center	1		
	GOVERNMENTAL	0		
	TOTAL	1	1	1
Papio anubis	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	0		
	OTHER			
	University			
	Medical institute	11		
	Medical school	5		
	Primate center	23		
	Undesignated	34		
	Medical school	11		
	Research institute			
	Medical	11		
	Non-medical	105		
	Subtotal	200		
	GOVERNMENTAL			
	Air Force	5		
	TOTAL	205	325	415
Papio cynocephalus	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	0		
	OTHER			
	University			
	Primate center	22		
	GOVERNMENTAL	0		
	TOTAL	22	22	24
Papio (= Mandrillus) leucophaeus	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	0		
	OTHER			
	Zoological garden	1		
	GOVERNMENTAL	0		
	TOTAL	1	1	1

APPENDIX A (cont.)

SPECIES BY FAMILY	KIND OF INSTITUTION	TOTAL USED IN 90 DAYS	TOTAL NUMBER USABLE	NUMBER IMPORTED
Papio spp.	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	0		
	OTHER			
	Chemical testing	30		
	University			
	Medical institute	11		
	Medical school	17		
	Undesignated	125		
	Medical school	11		
	Research institution			
	Medical	14		
	Non-medical	201		
	Animal dealer	6		
	Subtotal	415		
	GOVERNMENTAL			
	Air Force	15		
	Army	11		
	Navy	16		
	Walter Reed Army Institute	6		
	VA hospital	9		
	Subtotal	57		
	UNKNOWN	112[1]		
	TOTAL	584[1]	784[2]	812
COLOBINAE				
Presbytis obscura	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	0		
	OTHER			
	Zoological garden	1		
	GOVERNMENTAL	0		
	TOTAL	1	1	1
PONGIDAE				
Pan troglodytes	NON-GOVERNMENTAL			
	PHARMACEUTICAL/ BIOLOGICAL	0		
	OTHER			
	University			
	Medical institute	2		
	GOVERNMENTAL	0		
	TOTAL	2	2	2

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[1] This figure may be an overestimate because it has not been adjusted for any re-exports of the species that were made from shipments arriving in October-December, 1979.

[2] This figure may be an overestimate because it has not been adjusted for any re-exports of the species that were made from shipments arriving in October-December, 1979. See Table 7 for clarification.

The International Primate Trade: Summary, Update and Conclusions

David Mack
and
Russell A. Mittermeier

I. Introduction

The chapters presented in this book provide perhaps the most complete account of one type of wildlife trade ever assembled. Much can be gleaned from reading the chapters, either individually or as a whole. Every facet of primate trade has been covered, from capture in the wild to use in laboratories and including volumes in trade, mortality, legislation, and captive breeding programs. While the conservation status of primates in trade was not the focus, a companion volume is now being prepared to provide a regional summary of status of the major primate species in trade (Mittermeier, in prep.).

II. Decline in Numbers of Primates in Trade

Two to three years have passed since much of the information in these chapters has been collected. However, it is interesting to note that the major trends identified in these chapters are still in effect. Perhaps most notable is that primate imports from the wild continue to decline, at least in the two largest importing countries. The United States dominated the trade in live primates during much of this century; prior to 1975, the U.S. probably imported more primates per year than all other countries combined. From imports of almost 200,000 primates annually in the late 1950's, imports have consistently declined. By the end of the 1970's, just over 20,000 per year were entering the United States. This downward trend continued into the 1980's, as primate imports dipped below the 20,000 mark for the first time in 1982; 16,651 were imported in 1982 and 13,148 in 1983 (Gray-Schofield & Chandler, in press).

Japan, the second largest importer of primates during the 1970's, also displayed a decline in imports during the early 1980's. Between 1974 and 1979, Japan consistently imported about 5,000 animals per year. Between 1980 and 1983, primate imports averaged under 3,200 annually (analysis of official Japanese published statistics).

Based on the above, imports from these two countries have declined at least a third between 1979 and 1983. If this trend were to be followed by all other consuming nations, then world trade in 1984 may involve only 43,000 primates. This is based upon Kavanagh's (this volume) total worldwide import figure of 64,399 primates in 1979.

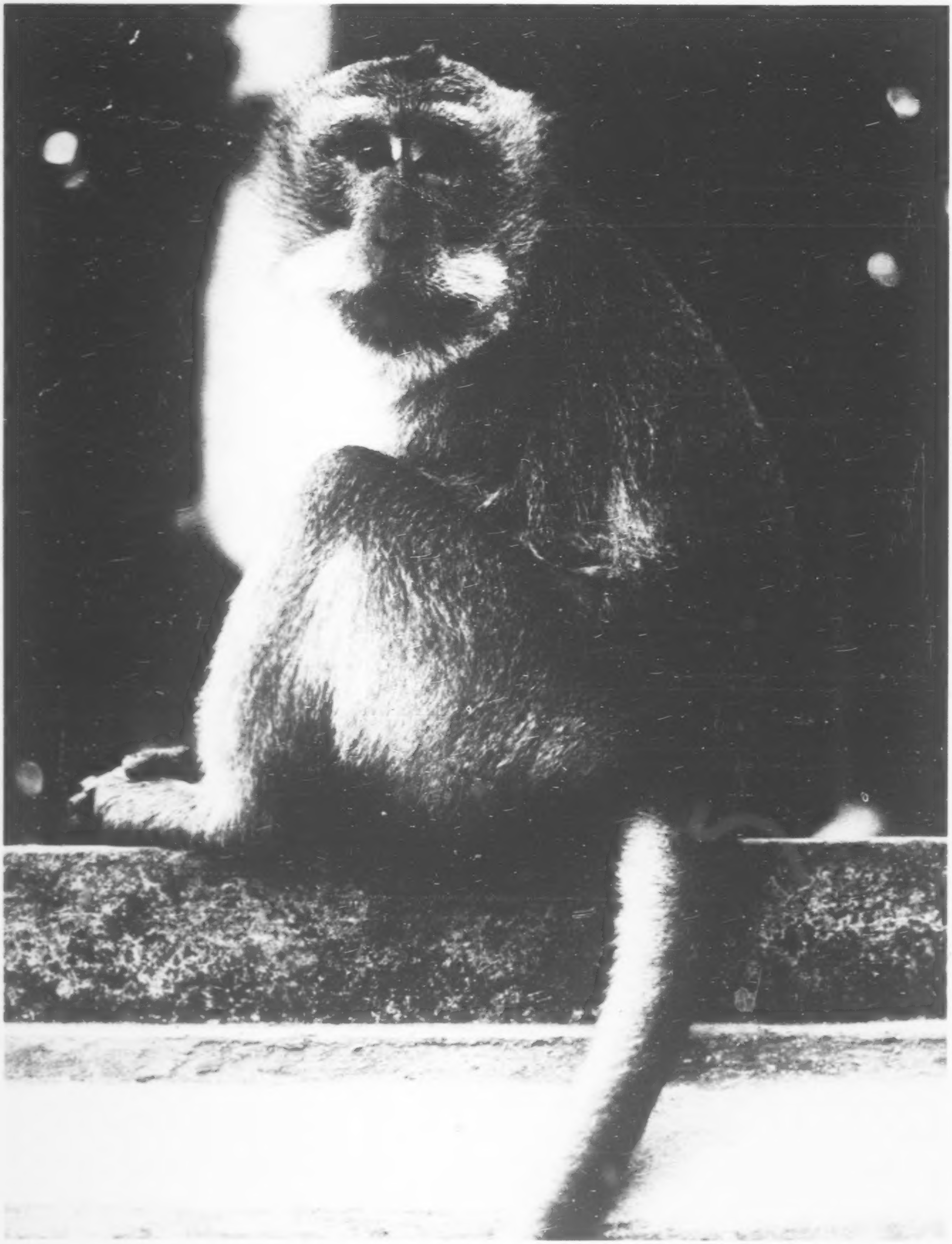
III. Countries Exporting Primates and Effects of Protective Legislation

Those countries identified as the major exporters of primates in the late 1970's appear to be the same today, at least for those primates entering the U.S. and Japan (Mack, 1983; Gray-Schofield & Chandler, in press; official Japanese published statistics). Indonesia, the Philippines and Malaysia are the major suppliers in Asia; Kenya, Ethiopia and Somalia in Africa; and Bolivia and to a lesser extent Guyana and Peru in the New World.

Legislation in many countries appears to be the major reason that the primate trade has declined over the last decade. A series of regulations implemented throughout the 1970's caused major shifts in trade routes. As a result, some species have become more difficult to obtain. Countries that were major suppliers of primates in the 1970's, but which have since banned the trade or severely reduced the number of primates exported include Bangladesh, Colombia, India, Panama, Paraguay, Peru and Thailand. The most significant primate trade regulations implemented in the 1980's, to date, are those of Malaysia and Bolivia (Anon., 1984a; Anon., 1984b). Malaysia, Indonesia and the Philippines have been the major suppliers of wild-caught long-tailed macaques. Following Malaysia's total primate trade ban on June 15, 1984, supplies of this species were still available from Indonesia and the Philippines. However, Bolivia's live wildlife ban, which went into effect on May 1, 1984 for a one-year period, will likely affect almost all consumers of New World primates as Bolivia provides most of the New World primates to importers throughout the world. Depending on whether the ban continues after the initial one-year period, new sources of Neotropical primates may need to be found and could cause consuming nations to increase breeding of Neotropical species, including the squirrel monkey (*Saimiri* spp.), tamarins (*Saguinus* spp.), and night monkeys (*Aotus* spp.).

IV. The International Wildlife Trade Convention, CITES

The Convention on International Trade in Endangered Species of Wild Fauna and Flora, CITES, has done much to effectively regulate primate trade. First and foremost, CITES has provided



The long-tailed or crab-eating macaque *(Macaca fascicularis)*, which is still exported in large numbers from the Philippines and Indonesia. This species is likely to be the primate most used in research during the remainder of this century. (photo by R. A. Mittermeier).

a list of endangered species (those listed on Appendix I) that should not be traded for commercial purposes. Prior to their CITES Appendix I listing, wild-caught endangered species such as chimpanzees, gibbons and cotton-top tamarins were frequently traded since most consumer nations had no legislation preventing endangered species from being imported. While trade in Appendix I primates from the wild still occurs, albeit less frequently, the CITES Secretariat is usually informed about these transactions and the international community usually has a chance to scrutinize and sometimes criticize these events. Recent occurrences include the import of 29 golden-headed tamarins by Belgium in 1983 (Anon., 1984c), the import of 30 chimpanzees from Sierra Leone by Japan in 1983 (1984d), and the sale of seven lowland gorillas by Cameroon in 1984 (CITES Secretariat, pers. comm., 1984).

All primate species not listed in CITES Appendix I have been placed on Appendix II. Even though these species can be commercially traded, this trade is regulated through a system of government permits issued by the exporting country (see Kavanagh and Bennett, this volume, for a summary of CITES and how it regulates trade in listed species).

V. Primate Species in Trade

The main species used by researchers in the late 1970's and early 1980's include the long-tailed macaque (*Macaca fascicularis*), rhesus monkey (*Macaca mulatta*), green monkey (*Cercopithecus aethiops*), baboons (*Papio* spp.), patas monkeys (*Erythrocebus patas*), squirrel monkeys (*Saimiri* spp.), night monkeys (*Aotus* spp.), capuchins (*Cebus* spp.), tamarins (*Saguinus* spp.), and the common marmoset (*Callithrix jacchus*). With the exception of the rhesus monkey and the common marmoset, all of the above species are obtained almost exclusively from the wild (see Caldecott & Kavanagh, this volume; Eudey & Mack, this volume). The common marmoset from Brazil is no longer available from the wild and wild-caught rhesus monkeys can only be obtained from China for prices higher than most researchers wish to pay (U.S. Interagency Primate Steering Committee, pers. comm., 1983). In 1984, captive-bred rhesus monkeys could be purchased for about $800, whereas China has been attempting to sell wild-caught rhesus monkeys for as much as $1,500 per animal.

VI. Captive Breeding of Primates for Research

Most countries have filled the need for primate species which are no longer available from the wild through captive breeding. Common marmosets are bred for research in large numbers in Europe, especially in the U.K. and West Germany (Caldecott & Kavanagh, this volume), and over 5,000 rhesus monkeys are bred in the U.S. each year (Mack, 1983).

Based on Caldecott's and Kavanagh's (this volume) assessment of use and captive breeding, an upward trend for breeding was predicted for many primate species. And indeed, there are some indications that breeding is on the rise in the 1980's. In the U.S. for example, breeding of rhesus monkeys has gone from under 1,000 annually in 1972 and 1973 to 3,158 in 1978; 5,377 in 1979; 5,815 in 1980; 6,049 in 1981; and 5,671 in 1982 (Mack, 1982; Eudey & Mack, this volume). In addition, there is an increase in the number of captive-bred animals declared in worldwide trade during the early 1980's according to data listed in CITES reports. For the most part, however, primates used for research in most countries are still obtained from the wild.

The United States set a precedent for primate recruitment in 1983. For the first time in its history, imports from the wild did not significantly exceed the numbers provided by captive breeding combined with those exchanged by institutions. Only 13,148 primates were imported by the U.S. in 1983 compared to approximately 6,000 bred and 7,135 animals recycled and placed in new institutions.

VII. Commercial Trade in Endangered Species

Trade in wild-caught endangered primate species still takes place. Belgium imported at least 29 golden-headed lion tamarins (*Leontopithecus chrysomelas*) in 1983 (Kavanagh, this volume), and it appears that this country has been involved in the import of wild chimpanzees, pygmy chimpanzees and gorillas from Africa in the early 1980's (Anon., 1983). Belgium joined CITES at the beginning of 1984, so it is too early to tell whether the import of endangered primate species from the wild will continue.

Even though Japan became a member of CITES in 1980, it has continued to import wild chimpanzees and gibbons, all of which are listed on CITES Appendix I. For example, at least 30 chimpanzees were commercially imported from Sierra Leone in 1983 (Anon., 1984d).

VIII. Conclusion

The live primate trade displays some of the best as well as some of the worst features of the wildlife trade. On the positive side, the number of animals traded from the wild has declined about four-fold over the last 25 years—from well over 200,000 primates traded in the late 1950's (mostly rhesus monkeys from India) to approximately 65,000 traded in 1979 (Kavanagh, this volume). Almost every country with indigenous populations of primates provides some type of protective or restrictive legislation relating to trade (Kavanagh & Bennett, this volume). In addition, based on the large volume of trade statistics that exist, more information is available on the primate trade than for any other group of animals.

More importantly, a few programs now exist (and more are being developed) in which wild primate populations are being studied and attempts are being made to exploit these animals on a sustained-use basis (e.g., PAHO primate project in Peru, see Kavanagh, this volume; Mack & Eudey, this volume). The legislation implemented by many source countries restricting trade has decreased primate supplies from the wild. This has caused consuming nations to take an active interest in captive breeding programs and recycling of animals into new projects when possible. As a result of the increase in captive breeding programs, much has been learned about captive-breeding management techniques, disease, and proper diet. All of this contributes to better care and maintenance of captive animals.

However, there is also a negative side to the primate trade that includes a number of serious issues. Illegal trade heads the list, since endangered and non-endangered animals are still smuggled out of countries that protect them and laundered into countries from which they can be exported. Many countries have increasingly tried to conserve their primate populations by implementing strong protective legislation, only to see these laws circumvented and primates still smuggled across their borders. During the 1970's, many countries were implicated in illegal trade, including Belgium, Bolivia, Laos, Paraguay, Panama and Singapore (see Kavanagh, this volume; Mack & Eudey, this volume).

As long as endangered species are desired by exhibitors or needed for biomedical research, it is likely that attempts will be made to obtain animals from the wild. The only way to curb these activities is to implement stronger enforcement techniques or to breed enough of these animals to meet demand. Sometime in the future, populations of endangered primate species may perhaps be managed in such a way as to allow export on a sustained-use basis, but this remains to be seen. In any case, it is certain that this subject will engender much debate by conservationists, scientists and government officials. However, the decision to allow trade will likely rest with parties of CITES. This forum focuses attention on the issues and lets the decisions be made by government officials of all participating members. The fact that almost all important primate exporting and importing countries are members of CITES probably makes this the fairest method of dealing with such situations.

Another area in which the primate trade could be improved is by reducing the numbers lost in capture, transport, and holding facilities in source countries. Too frequently, careless capture techniques, improper care, and inadequate holding facilities lead to excessive primate mortality. Data for long-tailed macaques show that approximately one animal dies for every one that reaches a researcher's facility in the United States — 68% die during capture and holding in source countries (Darsono, 1979), and an additional 17% are dead on arrival or within the first 90 days upon entering the U.S. (Mack & Eudey, this volume). In the past, collection of wild primate by organized expeditions has reduced primate losses (Muckenhirn, 1975), and some of these expeditions have included innoculation of animals against disease prior to export. While costs are much higher using this method, "the reduction in quarantine losses decreased the difference between monkeys acquired by the expedition and those imported commercially. The anticipated benefits from decreased death losses in the breeding colony resulting from reduced incidence of pathogens will further offset and justify the greater initial expenditures (Kaufman, pers. comm., 1974)" (in Muckenhirn, 1975, p. 51).

One further topic relating to the trade is the ethics of primate use, especially use in which the animals suffer pain. For example, between 1978 and 1982, 2% of the primates used in the U.S. (5,404 out of 276,295) experienced "pain or distress" according to annually published U.S. Department of Agriculture *Animal Welfare Reports*. An additional 35% of these primates were "animals to which pain relieving drugs were administered to avoid pain or distress". The topics of humane treatment and appropriate use are even more controversial than the trade itself and involve a variety of different issues. They could easily fill another volume and have not been covered here. For a discussion of these issues, readers are referred to Anon. (1983), Held (1983), Regan (1983) and Rowan (1984).

At this point in time, it is hard to predict what the future holds for the primate trade and the continued use of primates in biomedical and pharmaceutical research. As a result of legislation in source countries, many of the species desired by researchers can no longer be obtained from the wild, but, at the same time, it is unlikely that large-scale captive-breeding programs will be developed for species still available from the wild (e.g., long-tailed macaque, green monkey). In addition, captive breeding of those species difficult to obtain from the wild (e.g., rhesus monkey, common marmoset, and chimpanzee) is not likely to increase rapidly unless demand also increases. Based on the continued decrease in imports by most countries, it would appear that the demand for primates in general is declining and some researchers are turning away from primates because the cost of purchasing, housing, maintaining and feeding them is enormous compared to, for example, a laboratory mouse or rat. On the other hand, many researchers prefer using primates because of their close phylogenetic relationships with man.

While questions remain about future trends in the primate trade, a few points should be obvious. Countries still exporting large numbers of primates should find out more about the status of their wild populations, and management plans should be developed to ensure that trade will not adversely affect the survival of any species. Consumer nations are urged to support studies aimed at assessing the population status of primates in use and to assist in development of the management programs needed to ensure their rational utilization. Finally, all countries are urged to join CITES and comply with its regulations. If all these things can be accomplished, illegal trade will hopefully diminish and the primate trade itself will not contribute to the extinction of any primate species.

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